THE MONTHLY

Review

Industrial Finishing Exposition

DETROIT, MICHIGAN

June 23 to 27, 1947

See Pages 52 to 54

APR 30 1954

JANUARY · · · 1947

SPECIAL

CLEPO BURNISHING COMPOUNDS

DEVELOPED BY CLEPO LABORATORIES

FOR ALL WATER CONDITIONS

These new Clepo Burnishing Compounds insure your obtaining maximum brilliance in a minimum burnishing time WITHOUT using an excess of burnishing compounds. With ordinary burnishing soaps an excess is needed to counteract water hardness before the soap is available for burnishing, also in extremely hard water no lustre can be obtained with ordinary burnishing soaps.

FOR WATER HARDNESS UP TO 40 ppm* for use with burnishing Shot. can also be used Without Shot if parts are Self-Rolling.		FOR WATER HARDNESS UP TO 1000 ppm* for use with burnishing Shot. These Compounds are so formulated that they work efficiently with Stone for Cutting down
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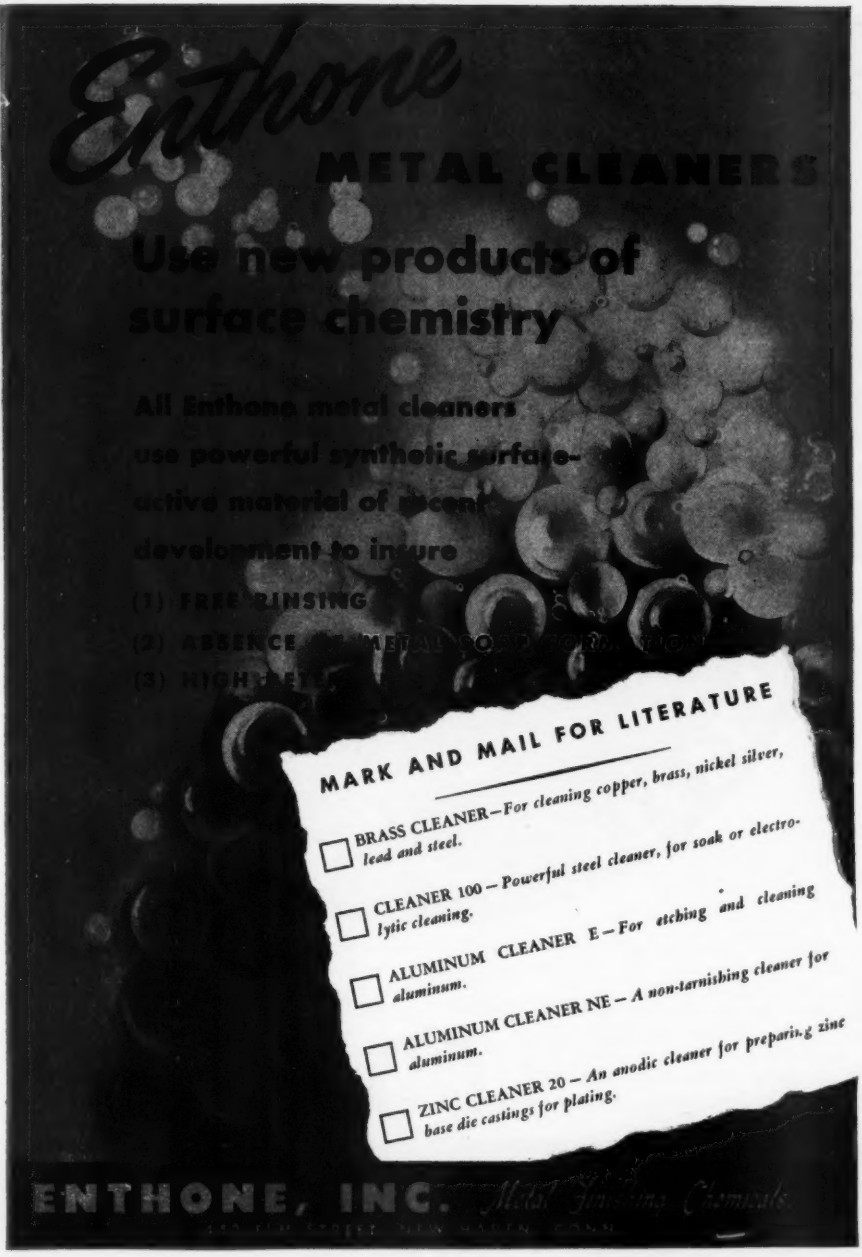
CLEPO 87-A ⇐	for Ferrous metals where some cleaning action is needed in addition to burnishing.	⇒ **CLEPO 167-C**
CLEPO 162-Z ⇐	For Zinc Base Die Castings and zinc Electroplate.	⇒ **CLEPO 164-M**

* PARTS PER MILLION (1 GRAIN PER GALLON IS EQUIVALENT TO 17.1 ppm)

FREDERICK **GUMM** *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.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(2) ABSENCE OF METAL FORMATION
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Metal Finishing Chemicals

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11

Industry's Finest

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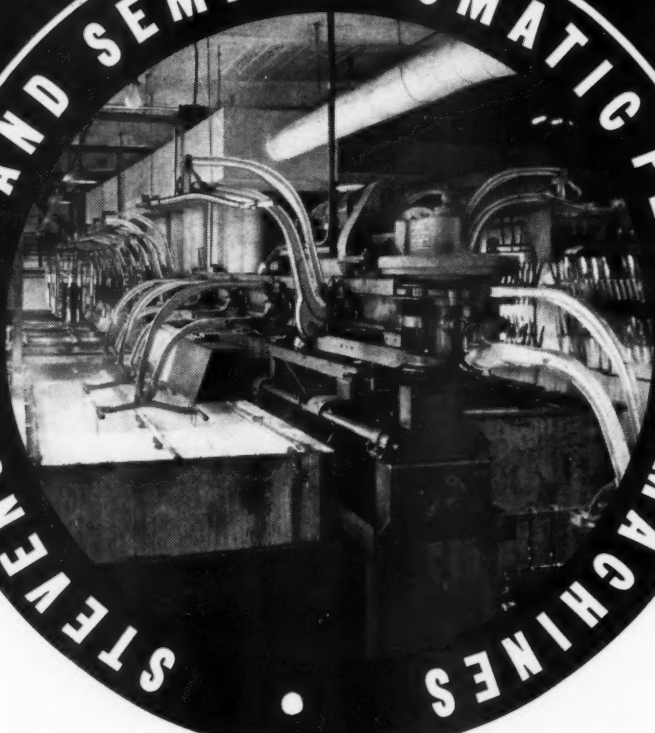

The performance of a machine in daily production determines whether or not it is properly designed and soundly engineered.

Stevens Full Automatic and Semi Automatic Plating, Cleaning and Pickling, Bright Dipping and Special Processing Machines have always met the most rigid requirements of the Plating Industry.

Today—with their several improvements and new developments—they are more than ever meeting the industry's most exacting needs.

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BUFFING COMPOSITIONS • METAL POLISHERS AND ELECTROPLATERS SUPPLIES-EQUIPMENT

THE MONTHLY

Review

VOLUME 34 • JANUARY 1947 • NUMBER 1

Published Monthly at
5800 N. MERVINE STREET
PHILADELPHIA 41, PA.
AMERICAN ELECTROPLATERS' SOCIETY
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JENKINTOWN, PA.
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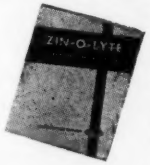

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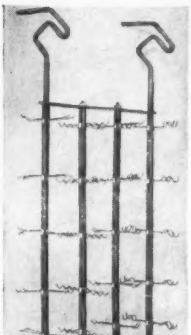

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Designed by Special Chemicals Plating Engineers. These racks fill a long felt want of industrial, jewelry, novelties and other metal manufacturers for plating racks as standard equipment that can be insulated.

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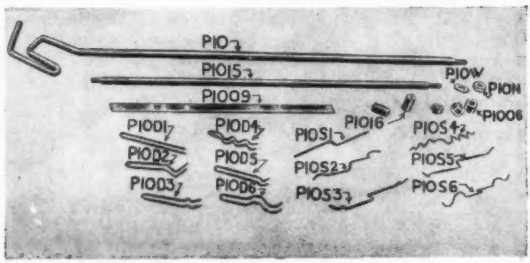

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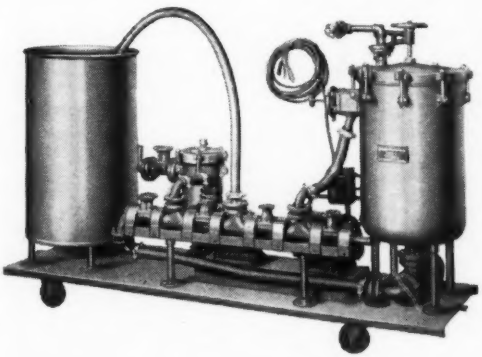
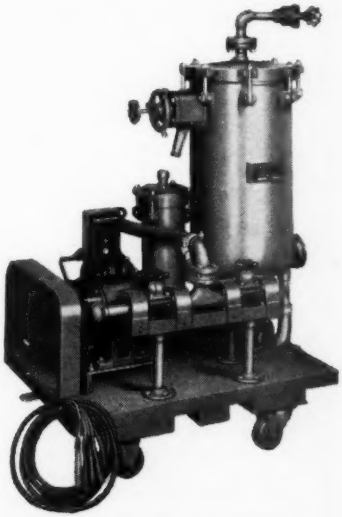
You can keep your plating plant operating at top efficiency only if you have adequate filtration. Industrial filter systems are designed and built to provide continuous high speed filtration and circulation.

Industrial Filters equipped with the AIRWASH cleaning feature have been in continuous use for months without opening the filters or removing the plates. Air agitation quickly dislodges the accumulated sludge and leaves the filter clean and ready for a new filter cycle. Many hours of production time are saved thus lowering your operating costs.



No. 1—Filter shown is equipped with slurry tank with double suction and discharge control providing an ideal continuous filtration system.



No. 2—A typical portable filter as constructed for bright nickel, acid copper and other acid type bath. Used for either intermittent or continuous filtration.

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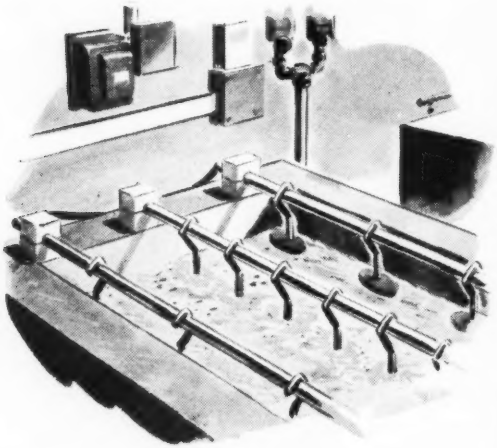
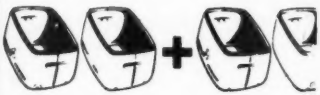
by using SMOOTHER-Plating UNICHROME COPPER



Smoother deposit requires less buffing—and in many cases, none at all!



Ductile deposit buffs up easier, faster—increases output of buffing room!

BUFFING takes time, costs money. Any way you can reduce buffing means savings. That's why it will pay you to remember these two facts about Unichrome Copper: First—it deposits so smoothly, you can completely eliminate copper buffing on many jobs! Second—if you have to buff because the base metal isn't smooth, Unichrome Copper brightens up not only with *lighter* pressure, but also much *faster*—so you put more pieces through the buffing room in less time!

These are *service-proved* facts. One plater, for example, reports a plating run of thousands of aluminum tubes without having to copper-buff at all. Another does a minimum of buffing on steel parts and then brings them up to proper lustre by buffing the Unichrome Copper instead. He finds Unichrome Copper buffs *fastest of all*, and provides worthwhile reductions in finishing costs.

Typical reports of savings like these explain the increasing use of Unichrome Copper in every important metal working industry. Its production tested advantages can build profits for you, too. A Unichrome engineer will be glad to talk over your problem. Write your nearest Unichrome office today.

7 advantages of UNICHROME COPPER

1. Requires less buffing — or none at all.
2. Mildly alkaline — easier on equipment.
3. Non-toxic solution — contains no cyanide.
4. Non-gassing — no ventilation necessary.
5. Moderate temperatures — cut heating losses.
6. High anode densities—fewer and cleaner anodes.
7. Clean deposits — require no activation.

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Efficiently counteracts attack on iron and steel. Added to acid, it reacts quickly and thoroughly in descaling . . . cleaning . . . inhibiting attack on iron and steel. Leaves base metal free from embrittlement.

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① long cycles
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Larger cake space — and cake stability even during intermittent operation — *is the secret*

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for

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Constructions for every solution—

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STAINLESS STEEL
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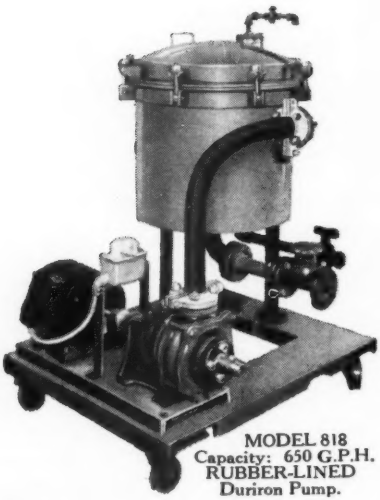
In continuous filtration, use SPARKLER'S AUXILIARY SLURRY TANK, AGITATOR AND PROPORTIONING PUMP, for accurate, automatic addition of filter aid.



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Capacity: 650 G.P.H.
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Capacities
60 to
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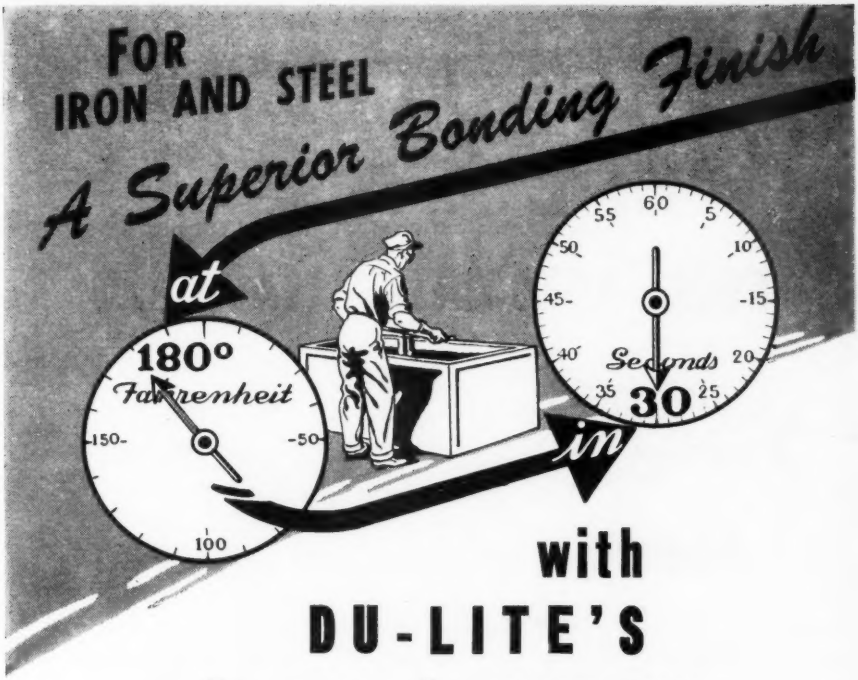

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Low cost - High accuracy

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It combines accurate temperature indication with automatic control. It is used extensively for both heating and cooling because it costs less, is more reliable and because of the easy adjustment by thumb screw and the built-in dial thermometer.

This is only one of the many Sarco plating controls which range from the low cost Sarco Thermoton, for approximate control of cleaning and rinse tanks, to the highly accurate TR-21 regulator used on many automatic plating operations.

Our representative can show you how others have solved plating problems similar to yours.

49

SARCO COMPANY, INC.
475 FIFTH AVENUE
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A heavy-duty cleaner, Wyandotte Porenac* is specifically designed to eliminate the cleaning bottlenecks common to every pickle room of porcelain enameling plants.

This balanced formulation quickly takes care of the toughest mineral oil drawing compound.

Porenac is economical, too. Its superior emulsifying action eliminates the necessity for pre-cleaning and saves time. Its concentration requirements are low. Additions are at a minimum and life of solution is remarkably long.

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THE SEYMOUR MANUFACTURING CO., Seymour, Conn.

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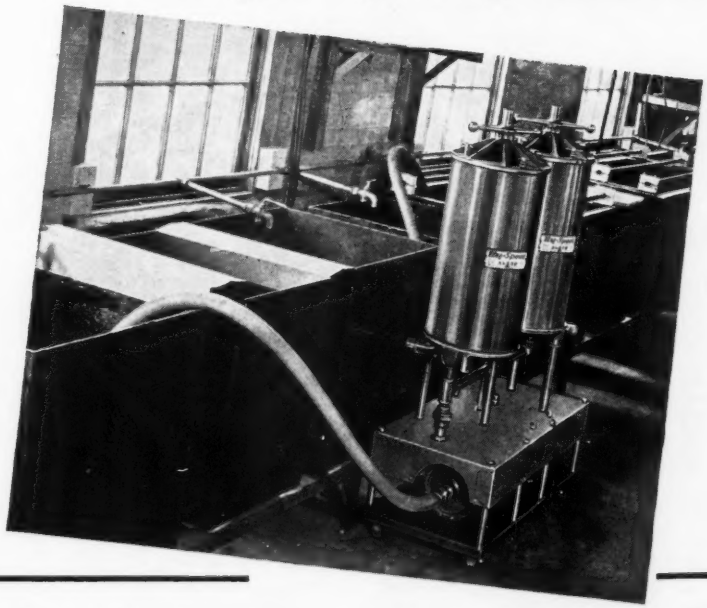
For your plating solutions



The Alsop "*Sealed-Disc*" Filter completely eliminates most of your troubles, that is dirt, dust, oil and sludge, which in any solution are responsible for pitting, spotting, poor adhesion, formation of nodules, etc., which mean costly rejects and re-working. This unique filter removes all traces of impurities from plating solutions, yet will not affect brighteners.

This means more perfectly finished work with a saving of time and labor.

You'll find the "*Sealed-Disc*" Filter light, compact, portable and easy to move from one tank to another for instant use, though capable of handling as large a volume of solution as conventional filters many times their size.

"*Sealed-Disc*" units can also be used for many acid dips, electro cleaners, solvents and other general filtration work.

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THE NEW MONITOR SWEEPER

Manufactured by WHITE AIRCRAFT CORP., Palmer, Mass.

with **BLACK** *by Pentrate*

This sleek new MONITOR Sweeper is finished in bright blues and reds accentuated by lustrous Pentrate black. Pentrate can't crack, chip, peel or rub off. And because it imparts durability and protection as well as appearance, the inside working parts of the MONITOR have been Pentrated too! Look at your own product. If a deep, rich black, either as a basic color or as trim, would add that sales-appealing punch, write for further information.

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Cowles

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MURAC is a fast acting, safe, inhibited acid-type cleaner, scale remover and pickling bath concentrate.

MURAC is economical to use—direct from carboy or diluted as much as one part MURAC to four or more parts of water.

MURAC has a highly selective action on the scale and does not attack the base metal noticeably. MURAC is consumed only in removing scale and rust, and *not* in pickling action on the metal surface.

MURAC improves working conditions because acid fuming is controlled.

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METAL CLEANING DEPARTMENT

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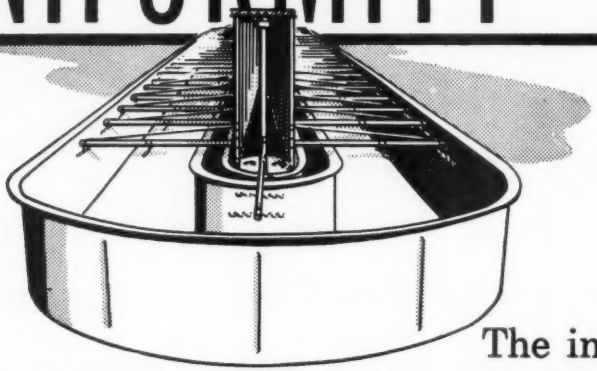
UNIFORMITY



The increasing use of automatic plating equipment places greater responsibility on the pre-cleaning operation. With Oakite before-plating cleaning compounds, you can be certain of uniformly thorough detergent action. These efficient and economical materials consistently provide the plater with the chemically clean surface so necessary for good plating adhesion. Your local Oakite Technical Service Representative will help you select the Oakite material and method that best fits your work. Arrange NOW for his FREE service. No obligation.

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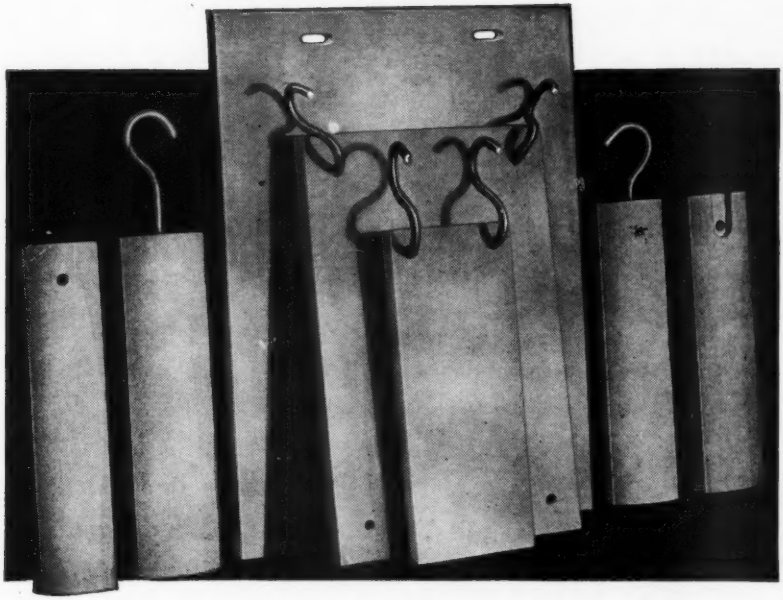

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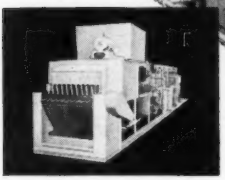

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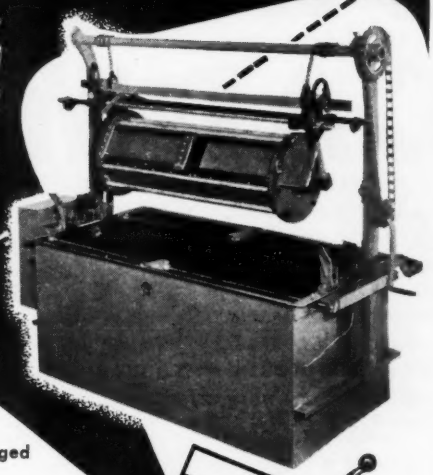

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Monthly Review January

Analysis of GOLD AND GOLD ALLOY Solutions

By EDWARD A. PARKER

TECHNIC, INC.— PROVIDENCE, R. I.

During the early stages of an investigation of acid-proof gold plating of military insignia, it was found that few, if any, methods for the analysis of gold alloy plating baths were suitable for use in even the best equipped plating rooms.

GENERAL

Gold

Available methods included:

1. Fire assay
2. Precipitation of metallic gold with ferrous sulfate or hydrogen peroxide, ignition and weighing
3. Reduction of auric gold with potassium iodide and titration of the liberated iodine with thiosulfate

Use of the first method has been confined to refining houses. The second, though tried many times in the plating industry, has been generally discarded because the many delicate points of procedure make it difficult to get consistent results when only a few tests are made each week. Both methods are adapted to analysis of a large number of samples on a production basis, such as 20 to 30 tests in duplicate at one time.

The third method has been used to a great extent in the analysis of 24-karat gold-plating solutions. However, the care and time required for the elimination of nitrites and acids are cause for criticism. When only one analysis is being run in a small plant, the operator is usually interrupted during the long evaporation stage. If overheating occurs, there is danger of spattering or of precipitation of metallic gold. This must be redissolved in aqua regia, requiring repetition of the evaporation step to remove the additional nitrites.

In gold alloy solutions containing copper, iron and other metals which react with iodides in acid solutions, no accurate gold determination may be made without lengthy separation procedures. There is evidence that even in the case of an alloy solution containing only gold and copper, the method does not give the true total of copper and gold because the optimum conditions for the iodide reaction are somewhat different for the two metals.

It is not yet feasible to determine gold colorimetrically. Most of the colorimetric methods so far devised are essentially qualitative in nature and do not give reproducible results quantitatively. It is hoped that a suitable quantitative method will soon be developed to replace the volumetric method described in this paper. Such a method should only require the elimination of cyanides and the reaction of gold with the color producing reagent at a given dilution. Other anions and the usual metallic impurities should not react with the color producing reagent. Only such a method would be more rapid than the present.

After considerable investigation of the literature, the method of Herschlag[1] was selected as most promising for the analysis of gold alloy solutions.

In brief, the method as finally modified includes elimination of cyanides with hydrochloric and nitric acids; removal of excess nitrites with hypochlorite; neutralization to litmus endpoint with bicarbonate; addition of potassium iodide; and titration of the liberated iodine with arsenious oxide. The gold content of the sample size is of the order of 10 to 80 mg.

Auric gold is the only metal ion which

reacts with iodide at a *p*H of 7 to 8. Additions of Fe^{++}, Fe^{+++}, Zn^{++}, Sn^{++}, SnO_3^{--}, Ni^{++}, Ag^{+}, Cu^{++} and Cu^{+} had no effect on the determination except when the basic salt was colored. Even then an unskilled operator quickly learned to detect the disappearance of the starch-iodide color. Details of the final, approved procedure and the tests made are given below.

Nickel

Very few detailed procedures for the determination of nickel in gold alloy solutions are found in the literature. Most of them depend on the gravimetric determination of nickel dimethylglyoxime after gold and copper have been removed. Since the amount of nickel usually is small, ¼ to 2 g/l, colorimetric methods were in order. The literature revealed a very confused picture of this determination.

Even though most methods are based on the formation of a soluble red nickel dimethylglyoxime, each author has introduced his own variations and claims that others are unsuitable for his particular application. An additional drawback is the instability of the red color.

Another colorimetric method is that of Mehlig[2] who measured the absorption at 580 mμ of the nickel ammonia complex. This method is not practical for the determination of nickel in gold alloy solutions for two reasons: first, copper in any amount interferes and must be removed before determination of the nickel; second, its sensitivity is low—requiring at least 0.5 gram of nickel per liter.

In spite of the numerous drawbacks, the soluble nickel dimethylglyoxime method was decided upon and developed. The amount of nickel in the final 100 ml for colorimetric observation should be within the range of 0.04 to 0.25 mg. After considerable experimental work had been done on the effect of variables, Makepeace's article[3] on the determination of nickel in steel appeared. In contrast to all other reported procedures, his produced a color which was stable for 24 hours or more. Further investigation disclosed that the concentration of ammonia was very important. Depending on the previous history of the sample and the reagents added, there was an optimum concentration of ammonia for best results. With slightly larger amounts of ammonia, the results were variable. Still larger excesses of ammonia gave increasingly lower results, until no color developed at all. Furthermore, the stability of the color that was produced decreased with increasing concentration of ammonia.

Copper

After considerable search of the literature, the more sensitive methods were discarded in favor of Mehlig's copper-ammonia complex method.[4] This method is operative in the range of 4 to 30 mg copper per final 100 ml of colored solution. A 5 to 20 ml sample of most pink gold plating baths will give such a concentration when diluted to 100 ml. Solutions for red golds, which were in vogue during the past season, would require a dilution to 200 ml.

Nickel and cobalt are the only metals liable to be present in an alloy solution which also would give a blue to green color and thus interfere with the copper determination. In the experimental section it is shown that with a photometer such as the Fisher instrument, nickel in amounts equal to the copper produces errors of 4 to 8 per cent. Since pink gold solutions cannot contain this much nickel and still plate properly, the error due to nickel may be neglected. Gold and iron are precipitated and removed by filtration. If colored anions such as chromates are present in amounts large enough to affect the determination, the bath will not plate properly.

EXPERIMENTAL AND DISCUSSION

Gold

The procedure for the determination of gold in gold and gold alloy solutions as developed after a study of all the variables, was as follows:

1. Pipette 25 ml of gold plating solution or the volume necessary to contain 20 to 50 mg of gold into a 400 ml beaker. This size sample is correct for a three to five pennyweight per gallon bath.

2. Under a fume hood, add 25 ml of concentrated hydrochloric acid, stir and bring

to a boil. Add 5 ml of concentrated nitric acid. Boil for five minutes.

3. Remove from flame and add slowly with agitation 25 ml of a 5% sodium hypochlorite solution. Then add 35 ml water. Mix thoroughly.

4. Boil gently for 10 minutes.

5. Allow to cool and add with stirring 20 ml of 20% sodium hydroxide solution. From a pipette or burette, add a saturated solution of sodium bicarbonate in portions of 5 to 7 ml. After each addition, stir vigorously and test the acidity by touching a piece of red litmus paper with the end of the stirring rod. The drop on the stirring rod should be made very small by removal of most of liquid from the stirring rod by bringing it in contact with the inside wall of the beaker several times before the litmus paper is touched. A faint trace of blue in the litmus paper is taken as the endpoint for the addition of bicarbonate.

If, after the addition of sodium hydroxide, the sample is alkaline, add one ml of dilute hydrochloric acid at a time until the sample is acid to litmus. Then add bicarbonate solution as described above.

6. Add 20 ml of 30% potassium iodide solution all at once with agitation. Allow to stand for two minutes.

7. Add 2 grams of solid sodium bicarbonate (one spatula full) and titrate with a standard 0.01 N arsenious oxide solution.

8. When the yellow-red iodine color becomes a pale straw yellow, add 2 ml of a 1% starch solution and continue the titration to the disappearance of the starch-iodine color.

In the presence of blue colored basic compounds, i. e., copper, it is best to add the starch solution at the beginning.

Preparation of Solutions:

Standard arsenious oxide solution: Dissolve 2.0 grams of arsenious oxide in 5 ml 20% sodium hydroxide solution. Neutralize the excess alkali with dilute sulfuric acid, using phenolphthalein indicator, until the solution just becomes decolorized. Dissolve 40 grams sodium bicarbonate in 1500 ml water and add to above solution. If a pink color develops, decolorize with a few drops of dilute acid. Dilute to one gallon and mix thoroughly. Add 5 ml carbon tetrachloride and mix thoroughly. Standardize against a weighed amount of pure gold. One mg gold will require approximately one ml arsenious oxide solution. The solution is quite stable.

Concentrated hydrochloric acid—CP, sp. gr. 1.19

Concentrated nitric acid—CP, sp. gr. 1.42.

Five per cent sodium hypochlorite—a vol commercial sodium hypochlorite solution diluted with two vol water. A solution such as "Chlorox" contains 5% hypochlorite and may be used "as is."

Sodium hydroxide—20 grams USP sodium hydroxide per 100 ml water.

Sodium bicarbonate—15 grams USP bicarbonate per 100 ml water.

Potassium iodide—30 grams of USP or CP potassium iodide per 100 ml water.

Starch solution—1 gram of soluble starch is mixed with 2 ml of cold water to a paste and 100 ml of boiling water is added with agitation.

Water—distilled water is used in all cases.

Calculations:

1 ml of arsenious oxide solution = 0.0974 × gold equivalent per ml expressed as mg = pennyweights gold per gal.

1 ml of arsenious oxide = 0.040 × gold equivalent per ml expressed as mg = g gold per l.

The general formula for the calculation may be expressed as follows:

ml arsenious oxide × gold equivalent (g gold = one ml of arsenious oxide) × 3785 ÷ ml of sample ÷ 1.555 = number of pennyweights of gold per gallon of plating solution.

The following chemical equations explain the reactions that take place during the analysis:

$$NaAu(CN)_2 + 2HCl = AuCl + 2HCN + NaCl$$

$$3AuCl + 9HCl + 2HNO_3 = 3HAuCl_4 + 4H_2O + 2NO$$

$$NaOCl + 2HCl = NaCl + H_2O + Cl_2$$

$$AuCl_3 + 3KI = AuI + I_2 + 3KCl$$

$$2I_2 + As_2O_3 + 2H_2O = As_2O_5 + 4HI$$

$$HI + NaHCO_3 = NaI + H_2O + CO_2$$

$$\frac{Au}{2} = I = \frac{As_2O_3}{4}$$

It should be noted that the reaction of auric gold with potassium iodide is rapid only in the *p*H range of 6 to 8. This requirement is easily met if care is taken to stop the addition of bicarbonate solution at the first permanent color change of the litmus paper.

At this *p*H, copper, nickel, and iron will precipitate as basic salts or hydroxides. It was thought at one time that the addition of a small amount of copper could be used to detect the neutral point. However, the precipitation was somewhat slow and extreme care was necessary in order to obtain the desired results.

In analyzing alloy baths from which colored basic compounds have been precipitated, it is best to add the starch indicator at the beginning of the titration because the color of iodine is obscured by the flocculent precipitate. The disappearance of the starch-iodine color is clearly evident even with much copper bicarbonate.

The results of the experimental verification of the standardized procedure are given in Table I.

TABLE II

EFFECT OF IMPURITIES ON GOLD DETERMINATION

Base Metal* mg	Gold taken mg	Gold found mg	Error mg
None	39.0	39.0	0.0
Nickel—33.0	62.0	61.9	−0.1
Nickel—81.0	39.0	39.0	0.0
Copper—61.0	62.0	62.1	+0.1
Copper—305.0	39.0	38.9	−0.1
Stannate—300	39.0	39.05	+0.05
Stannous chloride—320	39.0	39.0	0.0
Stannous chloride—640	39.0	39.0	0.0
Ferrocyanide—200	39.0	39.1	+0.1
Ferricyanide—300	39.0	39.1	+0.1

*The words "base metal" indicate here a metal less noble than gold.

Some difficulty was encountered with large additions of ferro- and ferricyanides in that a bluish-brown color was produced which obscured the disappearance of the starch-iodine color. When the quantity of ferrocyanide was reduced to between ½ and 1 oz/gal in the original bath, the interference became insignificant.

Base Metals

As already indicated, colorimetric methods were selected for the estimation of copper and nickel in gold alloy solutions. The Fisher Electrophotometer was used to measure the color intensity. The operation of this instrument has already been described in detail in this journal.[5]

Nickel

The detailed procedure as finally developed was as follows:

1. Pipette into a 250 ml beaker a 5 ml sample of the alloy plating bath or a volume which contains 0.5 to 6.0 mg of nickel.

2. Under a good fume hood, add 10 ml 50% sulfuric acid solution, bring to a boil and then add 2 ml of concentrated nitric acid. Shake, bring to a boil again and continue boiling for five minutes.

3. Cool, transfer quantitatively to a 250 ml volumetric flask and make up to volume. If a precipitate forms, filter.

4. Pipette a 10 ml aliquot into a 100 ml volumetric flask, then add 40 ml of water and shake.

5. Add 5 ml of a 20% potassium tartrate solution and shake.

6. Add 5 ml of saturated bromine water and shake.

7. Add 5 ml of concentrated ammonia and shake.

8. Add 4 ml of a 1% dimethylglyoxime in methanol and shake.

9. Add 5 ml of saturated bromine water and shake.

10. Allow to stand 60 seconds and then add 10 ml 24% sodium hydroxide solution, dilute to mark and mix thoroughly.

11. Allow to stand 5 minutes, and then compare with distilled water in any suitable photoelectric photometer such as a Fisher Electrophotometer. The procedure with the Fisher instrument is as follows: With distilled water in the 22 mm diameter cell and the 525B filter in place, adjust the light intensity to 100 per cent transmission, or 0.0 on the "A" scale. Now place the unknown solution in place and adjust until there is no deflection on the galvanometer. From the reading on the "A" scale, determine on the calibration graph the

grams of nickel per liter of plating solution.

Preparation of Solutions:

50% sulfuric acid—one volume of each water and sulfuric acid (sp. gr. 1.84).

Concentrated nitric acid—sp. gr. 1.42.

20% potassium tartrate solution—20 grams potassium tartrate in 100 ml water.

Saturated bromine water—one ounce liquid bromine in 700 ml water. *Caution:* Use only under a hood.

Concentrated ammonium hydroxide—sp. gr. 0.90.

1% dimethylglyoxime—10 grams dimethylglyoxime in 1000 ml methyl, ethyl or isopropyl alcohol.

24% sodium hydroxide—6 N or 24 grams sodium hydroxide per 100 ml water.

The concentration of nickel in the final solution should be in the range of 0.02 to 0.25 mg. For such a solution as the white gold bath[6], which contains 4.2 grams nickel per liter (10 dwt per gal), there would be 0.84 mg in the final solution of the above procedure.

Therefore dilution of the 5 ml sample to 500 ml and a 5 ml aliquot would be required to bring the concentration into the optimum range.

However, this type of white gold solution is seldom met with any more. The amount of nickel in the usual alloy solution is such that the procedure detailed above will work. In a few cases such as of a 20K yellow gold plating solution, the sample size may be doubled.

TABLE II
CALIBRATION OF THE ELECTRO-PHOTOMETER FOR NICKEL DETERMINATION

Standard Solution ml	Nickel in sample mg	Photometer reading	Nickel in bath g/l
5 (a)	0.0778	23.6	0.389
10 (a)	0.1555	47.0	0.7775
15 (a)	0.2333	65.0	1.1665
5 (b)	0.0622	20.0	0.3110
10 (b)	0.1244	38.0	0.6220
15 (b)	0.1866	54.0	0.9330

(a) Standard containing 0.01555 mg nickel per ml.
(b) Standard containing 0.01244 mg nickel per ml.

The treatment of the dimethylglyoxime solution with bromine as suggested by Makepeace produced variable results depending on the time of treatment. Use of a 1% dimethylglyoxime solution in commercial methanol gave consistent results and no difficulty has developed with a large number of solutions prepared with alcohol of this grade.

The almost straight line calibration graph in Fig. 1 was constructed from data in Table II obtained with standardized solu-

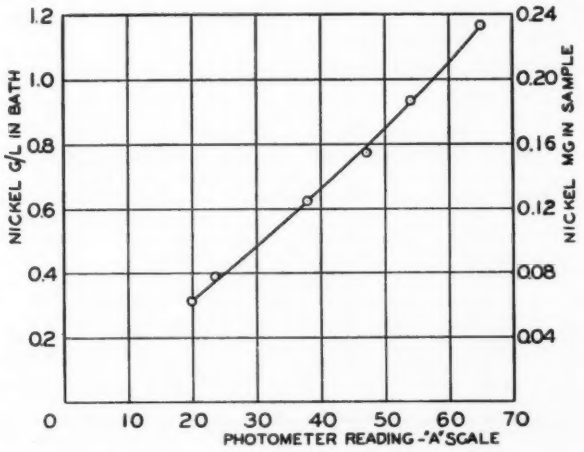

Fig. 1. Calibration chart for nickel in gold solutions

tions of nickel sulfate. Electrolytic nickel was dissolved in nitric and sulfuric acids and made up to 1000 ml, and the nickel content determined electrolytically in a sample. Ten ml of this solution was diluted to 250 ml.

TABLE III
EFFECT OF AMMONIA ON NICKEL DETERMINATION

Actual nickel content of sample = 0.1555 mg, equivalent to 0.7775 g/l nickel in a bath

Ammonia in sample ml	Photom-eter reading	Apparent nickel content*	
		mg	g/l in bath
2.0	50.5	0.172	0.86
5.0	49.5	0.170	0.85
5.0	50.0	0.172	0.86
7.0	42.0	0.142	0.71
10.0	36.5	0.122	0.61

*Per Fig. 1.

"A" scale readings higher than 60 depart from the straight line relationship between color and nickel concentration.

The effect of ammonia was next tried, using standard nickel sulfate solutions and solutions prepared from plating baths. Judged from the data in Table III, the maximum amount for consistent results appeared to be 5 ml.

The amount of gold present had little or no effect when the cyanides were removed with sulfuric acid. The excess gold precipitated and was removed by filtration before taking an aliquot.

The results obtained on addition of various amounts of copper are shown in Table IV. It is seen that copper may be present in amounts equal to the nickel without causing measurable error. In amounts equal to twice the nickel, copper causes an error of 7 to 10 per cent. Larger amounts of copper produce rapid fading of the nickel color as the copper reacts with the dimethylglyoxime.

Copper

The final procedure was as follows:

1. Pipette a 5 ml sample (or a sample of such size as to contain 10 to 20 mg copper) into a 250 ml beaker.

2. Under a fume hood, add 5 ml concentrated sulfuric acid, stir and add 2 ml concentrated nitric acid.

3. Heat and let boil for five minutes.

4. Cool, add 10 ml water and neutralize by carefully adding concentrated ammonium hydroxide from a burette. At the neutral point, a blue-green precipitate will form. Redissolve it with a few drops of ammonium hydroxide without overstepping the endpoint. Cool.

5. To a 100 ml volumetric flask, add 20 ml concentrated ammonium hydroxide.

6. Transfer the cold neutralized sample from step 4 to the 100 ml flask in step 5. Wash all traces of the sample in the beaker into the volumetric flask. Three to five washings of 5 to 8 ml each from a wash

TABLE IV
EFFECT OF COPPER ON NICKEL DETERMINATION
Actual nickel content of sample = 0.1555 mg, equivalent to 0.7775 g/l nickel in a bath

Copper in sample mg	Ratio copper/ nickel	Photom-eter reading	Apparent nickel content*	
			mg	g/l in bath
None	0.000	46.5	0.156	0.78
1.08	0.695	46.2	0.155	0.775
3.26	2.1	44.0	0.149	0.745
8.70	5.6	40 35†	0.134 0.116	0.67 0.58

*Per Fig. 1.

†Color fades shortly after addition of dimethylglyoxime and may be restored for varying lengths of time with more bromine water. Addition of twice the standard amount of dimethylglyoxime does not give any more consistent results.

bottle with fine tip are usually adequate.

7. Dilute to volume with distilled water and mix thoroughly.

8. If there is a precipitate, filter through dry filter-paper.

TABLE V
CALIBRATION OF ELECTROPHOTOMETER FOR COPPER DETERMINATION

Copper in sample mg	Photometer reading	Copper in bath g/l
5.6	10.5	1.120
10.8	20.5	2.24
21.6	41.5	4.48

9. Fill the 22 mm diameter absorption cell with the filtered solution and compare with distilled water in any suitable photoelectric photometer, such as the Fisher Electrophotometer. The procedure with this instrument is as follows: With distilled water and the 650 filter in place, adjust to 100 per cent transmission or 0.0 on the "A" scale. Now place the unknown solution in place and adjust until there is no deflection on the galvanometer. From the reading on the "A" scale, determine on the calibration chart the grams of copper per liter.

Calibration of the instrument with a standard copper sulfate solution gave the results shown in Table V and Fig. 2.

The first variable studied was ammonia concentration. Preliminary experiments indicated a linear variation in color absorption as the amount of excess ammonia was increased. Using a blank of the same concentration of ammonia had no effect on this variation. The procedure followed for the tests given in Table VI was as follows:

A standard amount of copper sulfate solution (10 ml = 21.7 mg copper) was added to a 100 ml flask and neutralized dropwise with concentrated ammonia

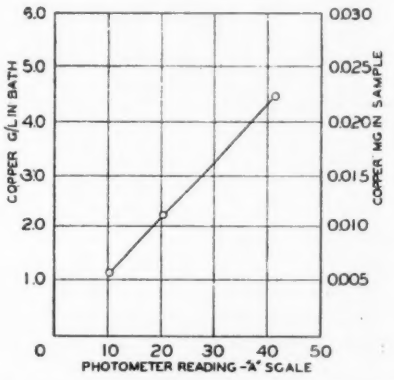

Fig. 2. Calibration chart for copper in gold solutions

until the copper precipitated. A drop or two in excess dissolved the precipitate, and then the definite excess listed in the

TABLE VI
EFFECT OF AMMONIA AND AMMONIUM SALTS ON COPPER DETERMINATION
Actual copper content of samples = 21.7 mg

No.	Excess free ammonia in sample		Photometer reading	Apparent copper content	
	ml	molar		mg	g/l in bath
1	5.0	0.75	30.5	16.5	3.30
2	10.0	1.5	34.5	18.6	3.72
3	20.0	3.0 (a)	39.2	21.4	4.28
4	50.0	7.5	46.0	25.25	4.92
5	20.0	3.0 (b)	39.5	21.3	4.27
6	20.0	3.0 (c)	39.6	21.3	4.26

(a) Chosen as standard in all subsequent work.
(b) 10.0 g ammonium sulfate and 1.3 g ammonium nitrate added before neutralization.
(c) 5.0 ml conc sulfuric acid and 2 ml conc nitric acid added before neutralization.

table was added and the whole diluted to 100 ml with water.

Since ammonia was a variable, the effect of ammonium salts was also tested in Nos. 5 and 6.

Of all the cations tested by Mehlig,[7] ammonium, cadmium, calcium, cobalt, lithium, nickel, potassium, silver, sodium, and zinc, only nickel and cobalt interfered with the determination of copper. Our determination of the effect of added nickel is given in Table VIII. The results indicate that nickel may be present in an amount equal to that of the copper without introducing an error greater than 5 per cent. Pink gold alloy baths seldom reach this proportion.

TABLE VII

EFFECT OF GOLD ON COPPER DETERMINATION

Actual copper in sample mg	Gold in sample mg	Ratio copper/ gold	Photom- eter reading	Apparent copper in sample mg	Error mg
20.8	None	0.0	38.5	20.8	0.0
20.8	5.44	3.8	38.5	20.8	0.0
20.8	10.8	1.9	38.2	20.75	−0.05
20.8	21.7	0.96	38.0	20.7	−0.1
21.7	65.1	0.33	40.3	22.0	+0 3

It is evident that ammonium salts has no effect. Consequently, the amount of acids added to eliminate cyanides or to decompose organic matter does not introduce variations. The 20 ml excess ammonia was chosen as standard because Mehlig had done all his testing of this method at that concentration.

TABLE VIII

EFFECT OF NICKEL ON THE DETERMINATION OF COPPER

Nickel in sample mg	Actual copper in sample mg	Ratio copper/ nickel	Photom- eter reading	Apparent copper in sample mg	Error mg
None	21.7	0.0	39.2	21.7	0.0
2.17	21.7	10.0	39.6	21.8	+0.1
4.3	21.7	5.0	39.3	21.7	0.0
10.85	21.7	2.0	40.8	22.4	+0.7
42.8	21.7	0.51	42.2	23.1	+1.4
111.0	21.7	0.20	48.5	26.5	+4.8
63.2	None	0.0	5.5	2.8	+2.8

The effect of gold was next studied and the results are given in Table VII.

The only difficulty encountered with increasing gold concentration was the tendency of the increasing amounts of precipitated and colloidal gold produced by the sulfuric acid and in subsequent dilution to mask the sharp neutralization endpoint with ammonia.

References

[1]Herschlag. *Ind. Eng. Chem. Anal. Ed.* **13**, 561 (1941).

[2]Mehlig. *Ibid.* **14**, 289 (1942).

[3]Makepeace. *Ibid.* **16**, 375 (1944).

[4]Mehlig. *Ibid.* **13**, 353 (1941).

[5]Foulke. *Mo. Rev. Am. Electroplaters' Soc.* **31**, 1103 (1944) and succeeding issues.

[6]Blum and Hogaboom. "Principles of Electroplating and Electroforming," McGraw-Hill Book Company, New York, 2nd Ed., 1930, p. 367.

[7]Mehlig. *Ind. Eng. Chem. Anal. Ed.* **13**, 533 (1941).

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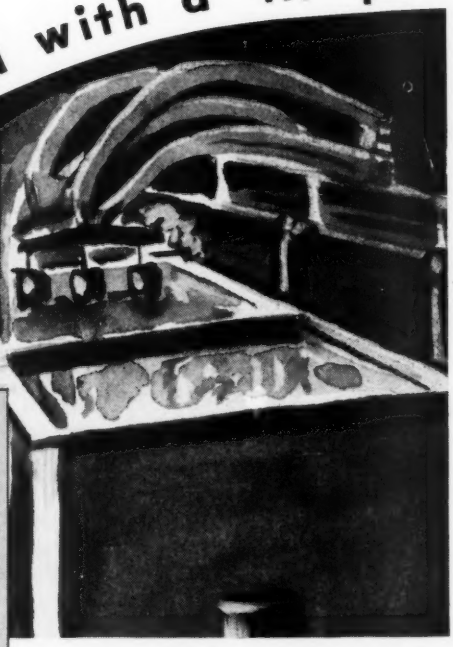

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CONTROL APPARATUS For The Production of UNIFORM ELECTRO-DEPOSITS FROM A RECTIFIED A C SUPPLY

By D. Ashby* and S. Wernick**

ONE of the biggest problems in the production of electro-deposits to specification standards is to attain an adequate degree of uniformity in the thickness of the deposits. It will be appreciated that the "throwing power" of most plating solutions is not of a high order and, as a result, the thickness of an electro-deposit on an article with any degree of complexity of shape varies very greatly from point to point. Electroplating solutions vary in their throwing power, e. g., cyanide solutions are much better than, say, chromium plating solutions which have extremely poor throwing power. Nevertheless, the problem applies to all plating solutions in varying degree.

To overcome the difficulty, specifications are laid down which call for a minimum thickness of deposit at those points which it is known will receive least current and, therefore, the smallest amount of metal. One of the most important requirements, if not in fact the most important requirement in the production of quality electro-deposits is that, once the specified thickness has been laid down, it shall be produced as a minimum in the shops. On the other hand, considerations of economy enter to make it undesirable to deposit metal appreciably in excess of the specified thickness requirement.

It will, therefore, be apparent that any means which ensures that the specified thickness of a deposit is attained on commercial articles represents a fundamental step forward in the production of electro-deposits of high quality. In this connection there is no doubt that increasing quantities of plated goods will be required to conform with these strict specification limits as time goes on. The last two or three years has seen a considerable impetus in this direction and there is every likelihood that it will affect the greater bulk of electroplated ware in the future.

The heavy current dc power supply is assumed to be derived from a metal rectifier, the control equipment referred to later in this paper being designed for operation with an oil-cooled selenium rectifier which has proved itself to be the most efficient and reliable rectifier for plating purposes. Rectifiers of this type are protected from the corrosive atmosphere of the plating shop by being totally enclosed in transformer oil; they are self-cooled by virtue of tubes being fitted, where necessary, to the tank in which the oil circulates by thermic-syphon action. There are, therefore, no cooling pumps to maintain. Water-cooling of the oil has been tried, but is losing favour on account of the complications and the lack of reliability. The overall efficiency, measured as the product of dc volt and amperes at the terminals of the rectifier tank divided by the ac watts input to the regulating transformer, is generally over 80 per cent and does not

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deteriorate with age. Equipment producing as high a current output as 16,000 amperes at 6 volts for nickel deposition is now being manufactured while, as illustrating the popularity of rectifiers today in British plating practice, the total current capacity of selenium plating rectifiers required from one British manufacturer alone has exceeded 800,000 amperes since 1940.

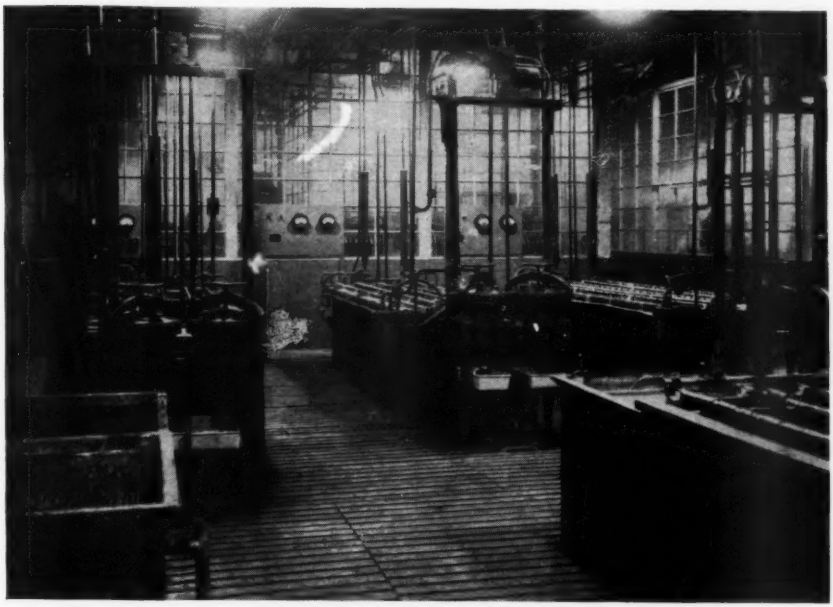

Fig. 1. General view of heavy nickel and bright nickel plating plant, with power and control room beyond

Early Attempts to Control Current

During the war period, extensive use has been made in Great Britain of the deposition of nickel and chromium to build up worn and over-machined parts and to obtain a hard-wearing surface. The process is often of many hours duration and, as the current density is critical, it is important that the current should not change. Variations in the bath temperature, the pH, the anode spacing and other causes may contribute to a change in the current density which may result in the work being spoiled, necessitating stripping and passing through the long deposition cycle again.

An alarm unit was developed to solve this problem in which any serious change in the value of the plating current caused a visual and audible alarm to be given whereon the operator's attention was called and the alarm persisted until the current had been restored to the correct value. As a rule, an increase in current is more serious than a slight decrease, it being necessary to prevent the current density from exceeding a critical value, while a reduction in density merely prolongs the process.

This alarm unit incorporates a robust relay which is connected across the terminals of a shunt in the main bus bars. A variable resistance is connected in series with the relay coil which consists of a few turns of heavy conductor to enable the current at which the relay operates to be adjusted at will, a stud switch and graduated dial being provided for the pre-set pick-up value. These components, together with an ammeter and voltmeter, are mounted with a heavy cast-iron core with gasketted joints so that it may be placed alongside the bath without risk of damage by corrosion and is designed

to operate from a standard 100 millivolt ammeter shunt. Warning lamps are fitted to indicate when the equipment is operating satisfactorily and when the current has drifted beyond the pre-set limits. A similar relay, adjusted to operate at the minimum voltage, may be used to give a low-current indication

(1) The current density shall be uniform.
(2) The specified time of deposition shall be adhered to.

The current density over the area of the article to be plated can be maintained constant, if due care is taken in adjusting the anode-cathode spacing and in maintaining

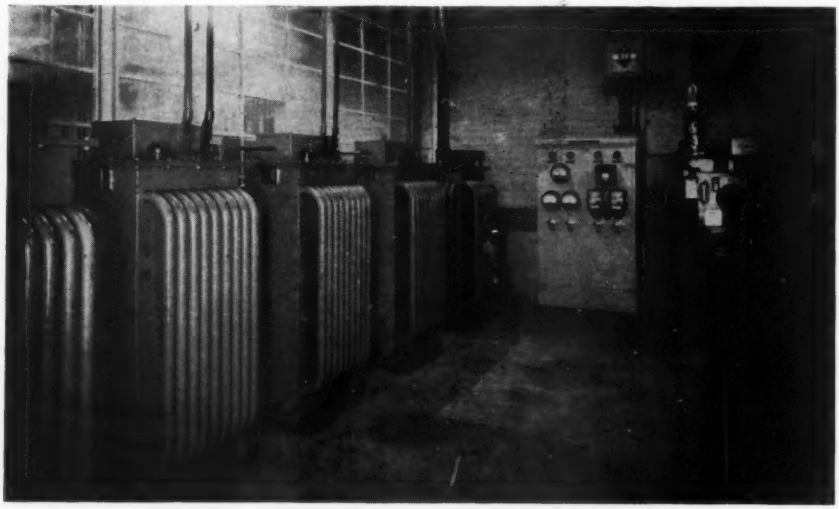

Fig. 2. General view of power and control room. 1000 and 500 ampere rectifiers are seen on the left; the control cubicle and the 1000 ampere etch it operates are shown together with the edge of the recording panel

Essential Requirements of Fully Automatic Control

The system already described merely gave an alarm when the current exceeded or fell below certain pre-set limits. It was left for the operator to adjust the current to its desired value and to switch off the current when deposition was complete. In view of the variety and complexity of the work handled during wartime, it was not practicable to extend the system further, but a wide application exists for automatic control in the repetition plating of commercial products produced in quantity to maintain a standard of reliable deposit without waste of material or uneconomical use of the plant in excess plating.

In order to achieve a specified thickness of deposit, there are two essential conditions to be satisfied:

the total current constant. The area of the work can be estimated and the current adjusted to the required value to obtain the desired current density.

Many articles to be plated are complex in shape; owing to the poor throwing power of the solution, the amperage per unit area of the work is not by any means uniform. Satisfactory deposition to obtain a minimum thickness of deposit is achieved by trial and error, the total current and the number and position of the anodes being adjusted until the desired results are obtained. In each case, close control of the current to the plating bath is essential while control over the duration of the process will result in the specified thickness of deposit being obtained.

The functions of the automatic control system, therefore, are as follows:

(1) To apply and maintain the initial current throughout the course of the deposition period. Using the rectifier as the source of power, auxiliary apparatus is required so that once it has been set at a given current, it will correct any fluctuations which may occur during the plating operation. Normally, if the plating conditions, e. g., temperature, agitation of the electrolyte, etc., are reasonably maintained in the initial condition, the current will automatically keep very near to the point at which it was initially set. Minor fluctuations may occur which the auxiliary electrical apparatus should correct. The device, furthermore, must be capable of preventing any deliberate attempt on the part of the operator to alter the current, by automatically resetting itself to the initial current and at the same time by recording the fact that a sharp change in current had occurred during the course of deposition.

(2) To cut the current off when the process time is completed by the introduction of a timing device in the auxiliary control apparatus.

The types of electroplating installations where the correct amperage is most readily ascertainable are the automatic and semi-automatic types of plating machine. In these machines, the vats or tanks, after the first initial period, are continuously loaded and the loading maintained at the same volume until the end of the day's work, it being assumed that the same type of component is being plated continuously.

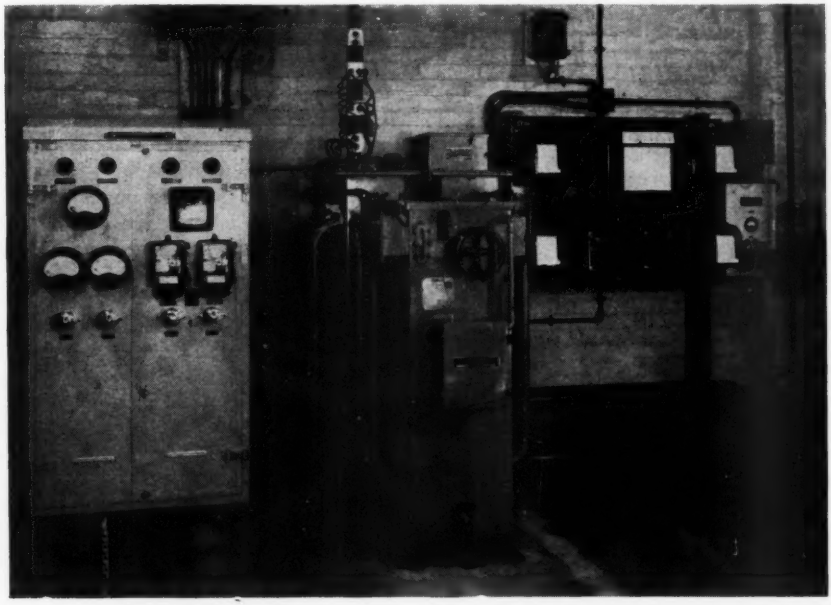

Fig. 3. Control equipment, 1000 ampere etch and recording panel

Control of Current

The current consumed in a plating bath is influenced by a number of unrelated factors, such as the conductivity of the bath, which is affected by the temperature and pH of the solution, and the anode-cathode spacing. The input voltage to the rectifier, which is subjected to the same variations as the local ac supply voltage, is another source of variation. Thus, to maintain the current substantially constant, it is not convenient to compensate for these factors independently, but to control from contacts on an ammeter in the plating circuit.

This contact ammeter, which is connected across the terminals of a shunt in the output

bus bars of the rectifier, has its "high" and "low" contacts connected to suitable pilot contactors which operate the "lower" and "raise" contactors energizing the motor

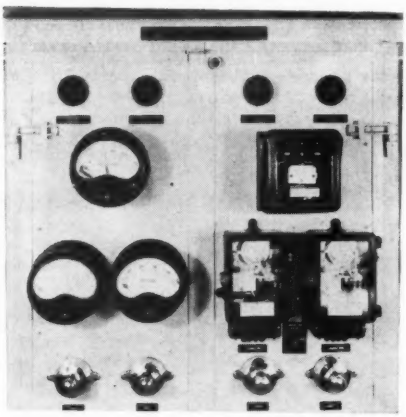

Fig. 4. Control cubicle showing instruments, protective relay and timing relays, with alarm lamps above

which actuates the driving mechanism on a moving-coil voltage regulator which supplies the main rectifier. Thus, by setting the contacts of the contact ammeter at a mean value of 1000 amperes, the current will be maintained within the limits of 950 and 1050 amperes despite variations in the mains pressure and in the solution, etc. If, owing to faulty conditions, such as a failure of one of the phases or a high resistance connection in the output circuit, the control mechanism is unable to hold the current value within the pre-set limits, an alarm is given which enables the operator to locate and correct the trouble without wasting time and money in plating a batch of work under incorrect conditions.

A synchronous motor, operating a train of gears with a trip mechanism shuts down the power supply after a pre-determined period; thus, both the current value and the time it is applied can be accurately controlled.

Into the set-up of a really effective and accurate control system, there enter other considerations, of which the following are the most important points:

Loading and Unloading Period

With some components the time of loading and unloading may be appreciably lengthy and may, in fact, prove to take up a considerable proportion of the total plating time. It is obvious that in such cases the amperage cannot be kept at a constant figure during the loading and unloading periods.

The objective is to provide a polarising potential to the work which is insufficient to allow any appreciable deposition yet will prevent surface attack. This is particularly important in nickel deposition.

The rectifier output is therefore reduced by connecting an auto-transformer in the main ac input circuit, this being more economical than using the moving-coil voltage regulator which would then have to be designed for a considerably greater range. Tappings are selected on the output side of the auto-transformer to suit the bath characteristics, and the circuit made by a contactor which

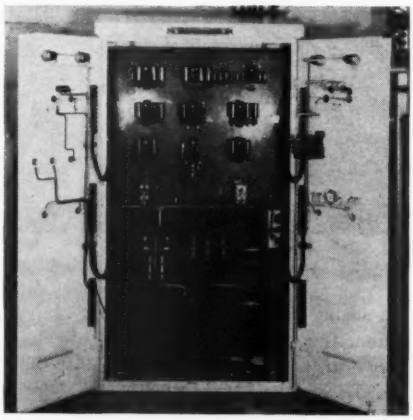

Fig. 5. Inside of control cubicle showing contactors, auto-transformer and isolator

disconnects the control circuit of the moving-coil regulator as the current flowing will be only a fraction of the normal plating current.

Before loading the bath, the operator presses a button which causes the rectifier to be energized through the step-down auto-transformer to provide the polarizing potential; when the bath is fully loaded, he presses

a further button which causes the full mains voltage to be applied to the moving-coil voltage regulator, which then adjusts the current to within the limits selected, and also starts the time mechanism which governs the duration of deposition, as already described. When deposition is completed, the control mechanism automatically reduces the rectifier output to the polarizing value to permit the work to be unloaded without further deposition or deterioration.

Warning of Approaching "End" Point

With regard to the timing device, it may be desirable that the operator be warned of the approaching period when the process is completed, so that the current is not suddenly cut off at a time when he may not be in a position to remove the work without delay and so obtain the maximum utility of the equipment.

An additional contact on the timing mechanism may be employed to give a warning two minutes before the plating current is reduced to the "unloading" value.

"Strike" Period

In some electrodeposition processes there is an initial strike period required when the current density applied is substantially higher than that at which the solution is maintained for the greater part of the plating period. This applies particularly to silver plating, chromium deposition, etc.

Facilities for a strike period are obtained by employing the auto-transformer in a step-up capacity, the duration of the strike period being governed by a time element relay. As in the case of loading and unloading, the automatic regulator control circuit is disconnected or it would reduce the current within the limits for which the apparatus had been adjusted.

Stand-by Power Supply

If the ac power supply should fail during the plating process, the work in the bath may be spoiled if not removed at once, and may have to be stripped and prepared for deposition again. In the case of heavy nickel deposition, the process may occupy several days so an interruption in the mains supply towards the end of the plating cycle will involve heavy expense.

To guard against this possibility, a large capacity battery is connected to the bath through a rectifier element, which permits the battery to discharge freely into the bath and so provides a polarizing potential to the work, but over-charging of the battery by the main rectifier is avoided by the high reverse resistance of the rectifier. A single lead cell provides an adequate polarizing potential for a nickel bath, but as the bath normally operates at about 4 volts, the battery could not be left connected unless the auxiliary rectifier were inserted to prevent over-charging. The alternative change-over contactor hitherto used for this purpose, which automatically disconnected the bath from the dc source and brought into circuit the stand-by battery, is thereby avoided. Since the auxiliary rectifier has to carry the relatively small depolarizing current, it occupies a small space compared with the change-over contactor which had to carry the full plating current.

A rheostat of high ohmic value is connected in parallel with the rectifier to permit a small trickle charge to the battery from the main rectifier. The battery is recharged after a supply failure, or given a short gassing charge after topping up to distribute the electrolyte, by short-circuiting the rectifier by means of a switch and adjusting the current on another rheostat. A centre-zero ammeter records the charge or discharge current, and it will be seen that under all conditions the battery is free to discharge into the bath whenever the voltage of the main rectifier falls below that of the battery.

Protection

The power equipment is protected in the usual manner by means of an isolator and high-rupturing capacity fuses, and a protective relay guards against low input voltage, an open-circuit on one of the three phases, or a phase reversal. No fuses or circuit breaker are necessary on the dc side, as the moving-coil voltage regulator is actuated by the contact ammeter and automatically reduces the input to the rectifier when the "high" limit contact is

made. No reverse current cut-out is, of course, necessary.

Included in the rectifier tank is a thermostat which normally closes a set of contacts indicating that the oil temperature is not excessive; if the temperature rises, due to such causes as restricted ventilation, an excessive ambient temperature, or a reduction in the oil level, a different set of contacts is made which shuts the plant down, and, furthermore, to have a record of the actual values obtained during the plating cycle. With this in view, a recording pH meter and a recording thermometer are installed in the supervisor's office, together with a recording dc ammeter and ac voltmeter. The records available will thus be of the greatest value in initial runs on the plant when adjustments are being made to suit a new article to be plated, as well as

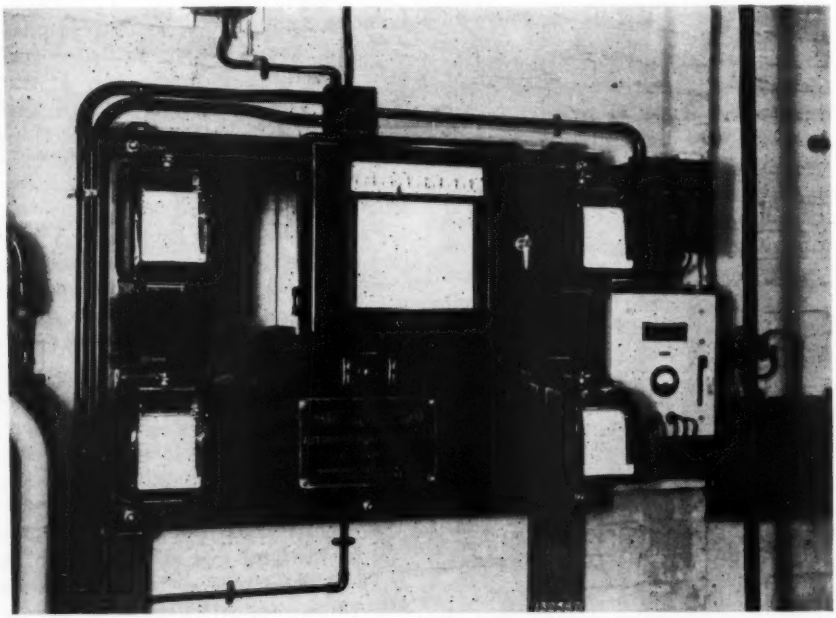

Fig. 6. Recording panel for output voltage and current, mains voltage, temperature and pH. The stand-by battery is seen on the right

but the work is protected from damage by the stand-by battery coming into operation. An alarm is given, and the plant can be restarted only by the "Reset" push button in the supervisor's office being pressed, which, subject to the fault being corrected, will allow the operator to start the process again.

Recording Instruments

While automatic control of the plating current and the duration of its application goes a long way to ensuring constancy of deposition, it is necessary to control the pH and the temperature of the solution in periodical check tests on the process when it is running steadily. Permanent records are available of the entire process which will prove invaluable when certain components are plated at irregular intervals, the records showing all the relevant adjustments to obtain satisfactory results, which can be repeated at will. A record can be kept of every batch of components put through the plating cycle and so provide data which would be of help in tracing the source of any trouble which might arise subsequently.

The principles have been fully incorporated for the first time in a special plant

which was specified and laid out by one of the authors, (S. W.). The plant was designed to produce both decorative nickel deposits on manufactured components, and also for the production of a heavy nickel deposit on special piston components which must be applied to very close dimensional limits. Photographs of the essential part of the plant are shown in Figs. 1, 2, & 3 while the control apparatus is shown in Figs. 4–7.

The layout of the plant has been arranged so that all the power and control equipment is centralized and under the direct supervision of the shop superintendent or works chemist. The latter is responsible for the initial adjustment of the plating current and the time of its application. All the recording instruments are also installed in the power house.

As for the operator, he has access to the "Start," "Plate," and "Stop" push buttons which are mounted on a panel carrying an indicating ammeter and voltmeter beside the bath. Indicator and alarm lamps are provided in the plating shop and are repeated in the power house where the "Reset" button is situated, should some fault arise during the plating cycle.

The plant illustrated was installed in the works of Messrs. W. & T. Avery Limited, Birmingham, England, and the authors desire to thank the Directors of that Company for permission to publish the description of the plant, and particularly to acknowledge the assistance freely given by the Research Superintendent, Mr. F. Willets, and the Works Engineer, Mr. F. C. Johnson, in the installation of the plant.

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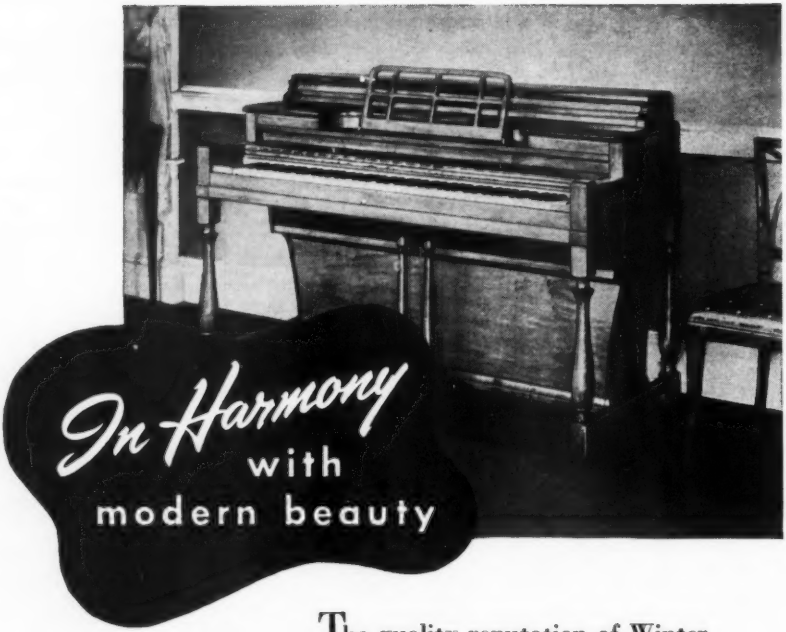

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George L. Nankervis, General Chairman of the Convention, has appointed as Exhibits Co-Chairman *Herbert Head* of the Briggs Manufacturing Company and *Edward Berry* of the Detroit Plating Industries. Their energy and capability and the cooperation of the A. E. S. Branch Societies and members should guarantee the success of this great educational project.

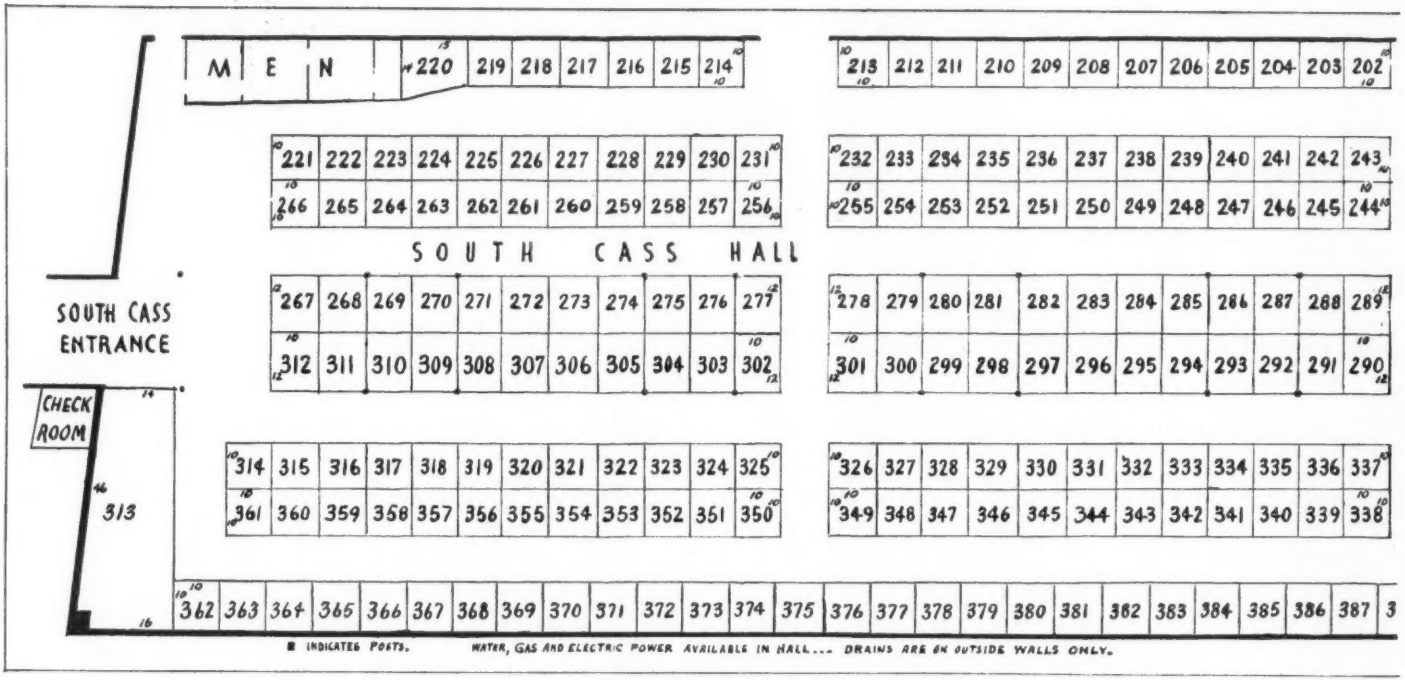
Suppliers of electroplating and metal finishing equipment, processes and materials are offered a unique opportunity to exhibit their products. *Manufacturers* are also being solicited to display their finished goods at the Exposition which will be nationally advertised.

The educational value of the Exposition cannot be over emphasized. *The buying public* will see what is involved in producing metal finishes. *The housewife* will see a display of both manufacturing methods and finished products. *The manufacturing executive* will see metal finishing in all its phases. *The electroplater and plant engineer* will see the newest technical developments.

A *floor plan* of the available space is presented on pages 52 and 53 for the information of exhibitors. Space and preferred locations are being allotted on a "first come—first served" basis. For details write *Industrial Finishing Exposition*, Convention Hall, 4484 Cass Ave., Detroit 1, Michigan.

All matters pertaining to the Exposition are handled by Society members whose services are rendered gratis. Net proceeds derived from the Exposition will revert to the Society treasury and will be used for research and educational purposes.

ARTHUR W. LOGOZZO, *Third Vice-President.*



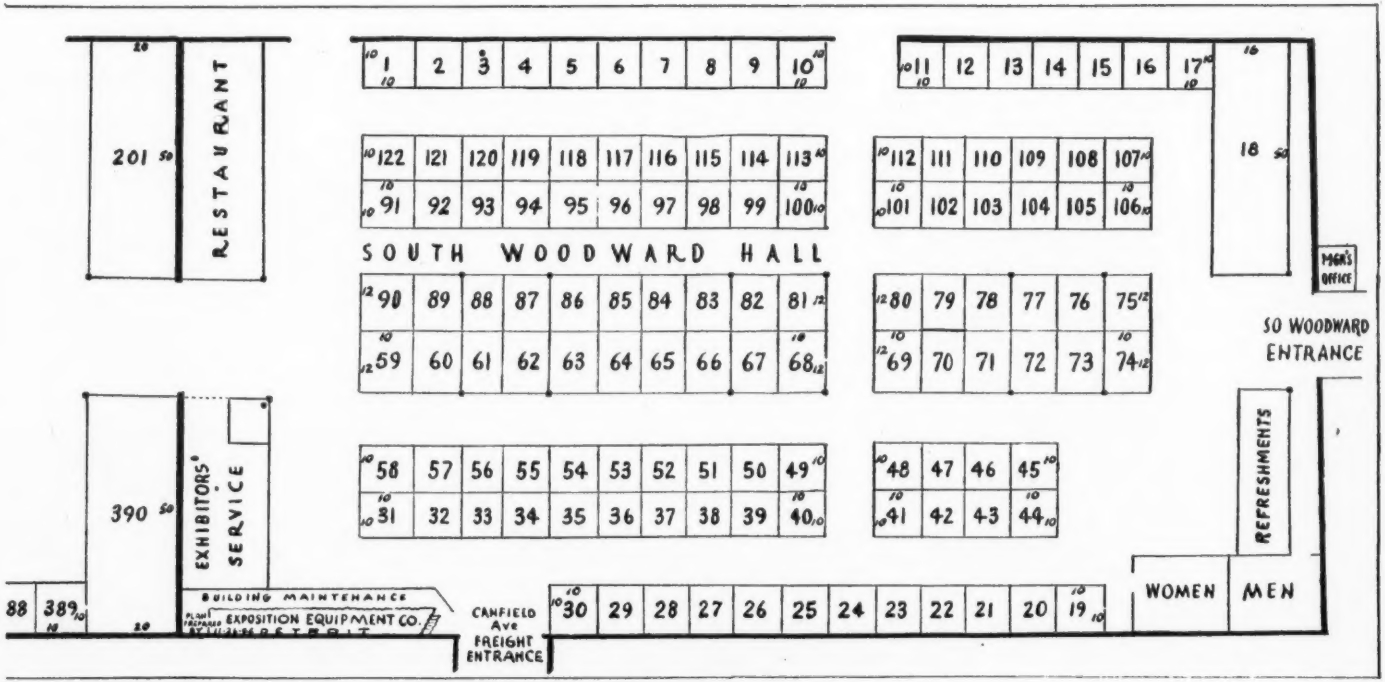
Floor Plan

INDUSTRIAL FINISHING EXPOSITION

Convention Hall

DETROIT, JUNE 23-27, 1947

PLAN CONTINUED AT BOTTOM OF PAGE 53



Floor Plan

INDUSTRIAL FINISHING EXPOSITION

Convention Hall

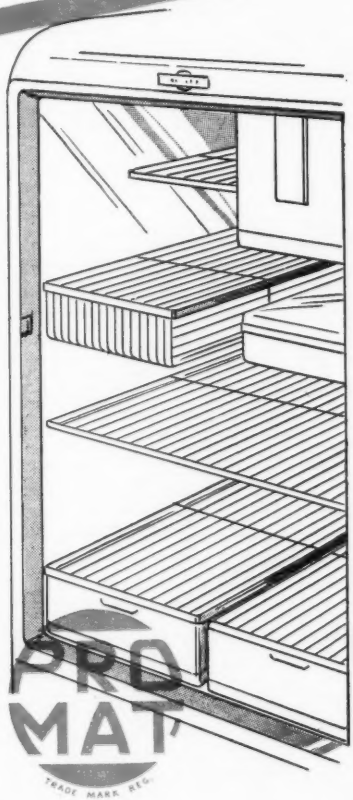
DETROIT, JUNE 23-27, 1947

PLAN CONTINUED FROM TOP OF PAGE 52

A POST-WAR DECORATIVE PROTECTIVE FINISH!

Pro-Seal

"TRADE MARK"



PRO-SEAL on **ZINC PLATE** brings up a grand Brilliance—inhibits and prevents white corrosion particles from forming for a considerably long period of time. While zinc is an ideal rust preventative—is cheap and easily applied electrolitically, its use has been limited for parts visible in final assembly because of dull and "dusty" corrosion products.

An adequate Zinc Plate plus Promat (non-electric) **PRO-SEAL** protects against **RUST** and makes any steel part **LUSTROUS, BRIGHT** and **ATTRACTIVE.**

PRO-SEAL is now specified and used to treat Zinc Plated Steel Refrigerator Shelves for a **MAJORITY** of domestic refrigerator manufacturers.

Hardware, automotive parts and hundreds of other fields can use **PRO-SEAL** to great advantage.

Distributors in principal cities — write to

PROMAT DIVISION—Poor & Company

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By DR. HAROLD J. READ
Associate Professor of Metallurgy
The Pennsylvania State College

THEORY AND PRACTICE OF FILTRATION, by George D. Dickey and Charles L. Bryden, 1946, VI + 346 pages. Reinhold Publishing Corporation, 330 West Forty-second Street, New York City. Price, $6.00.

Although the word "theory" stands first in the title of this book, the reader soon finds that it occupies this position only as a gesture towards euphony, since, as a matter of fact, the authors dispose of the theoretical aspects of filtration very quickly and only really buckle down to work when dealing with the practical side of this important operation. It is felt that the title, "Practice of Filtration", would be more aptly descriptive, since the amount of theory given is only that which one might expect as the seasoning in any practical plant operator's literary victuals.

With this limitation in mind the book is found to be a satisfactory guide to filtration. The material is descriptive but not limited to a catalog recital. The functions, limitations, capacities, advantages and disadvantages of the many types of filtering processes and equipment are set forth with numerous diagrams and photographs. Unfortunately, there are no direct references whatsoever to the filtration of plating solutions, but this need not detract too seriously from the interest of the plater who will find considerable matter of direct application to his problems.

The book opens with an interesting chapter on the history of filtration which is followed by the 16 pages which comprise the whole of the formal theoretical discussion. It should be noted that a very considerable number of references are given at the end of this short chapter on theory while the remainder of the book is very meagerly supplied with suggestions for further reading. The next three chapters are of a general nature, dealing in turn with filtration objectives, preparation for filtration and filter media. Subsequent sections deal with more specific phases of filtration. The many types of gravity, pressure, vacuum and hydraulic filters are thoroughly discussed. Other means of separating materials are also considered, particularly centrifugals and centrifuges.

A rather long chapter presents an entirely adequate discussion of certain types of auxiliary equipment needed in the filtration process. Pumps of many varieties, both pressure and vacuum, are described at some length. Feeders, tanks, conveyors, valves, controls, etc., are treated briefly but sufficiently.

The chapter on the testing and selection of equipment is not particularly illuminating or helpful. It further supports the opinion that the authors are at their best when dealing with descriptive rather than analytical writing.

The final chapter on installation and operation is brief but sufficient in view of the fact that details of this sort should properly come from the manufacturers and suppliers of equipment.

It is the reviewer's impression that here is a satisfactory book for addition to the practical plater's library of sources of general background information—information which is invaluable in assisting him in making the most advantageous use of the machines and methods available to him.

FINISHING METHODS AND MATERIALS

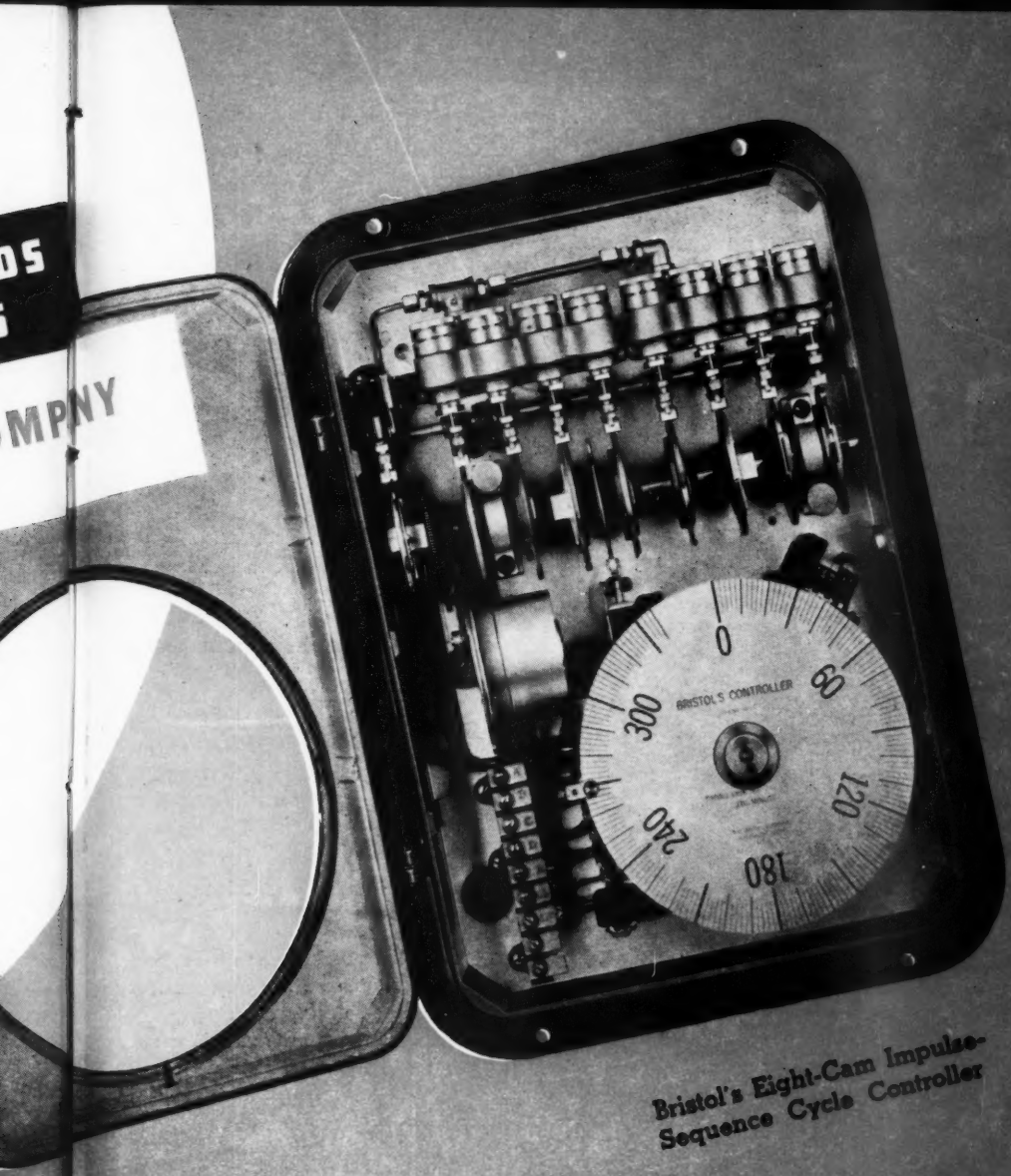
do a lot of work for THE BRISTOL COMPANY

LEA Methods and LEA Compositions assist in finishing many parts for instruments made by The Bristol Company of Waterbury, an outstanding manufacturer in this field. This company, appreciates that in LEA can be found the answer to most finishing problems... the key to high quality, economical, precision polishing, buffing and burring.

Industry in general, has also learned to rely upon the services of LEA Finishing Engineers for analyzing finishing problems and for selecting from their wide variety of greaseless and "no-free-grease" compositions the proper ones for each problem.

Perhaps you aren't satisfied with the quality or cost of your finishes. Why not let us help you? Send the details of your problem and, if possible, samples.

BURRING • BUFFING • POLISHING



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Rectangular tanks are made in capacities ranging from 4 gallons up to 320 gallons; cylindrical pots and tanks in capacities from 5 to 500 gallons.

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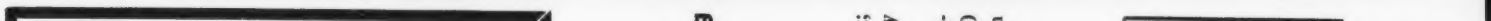

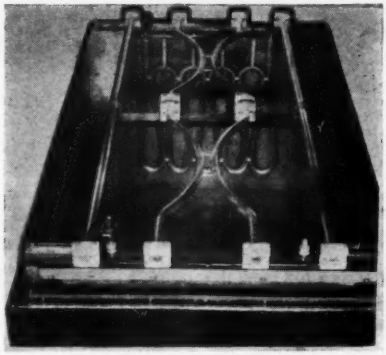

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HIGH spots in Stortswelded tanks for chromium plating service are value and utility, improved plating conditions, long life, satisfaction and economy. The many hundreds now in service include all types and sizes—for all methods of operation.

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CHICAGO BRANCH

The regular monthly meeting held on the second Friday of November featured MR. E. C. COFFEY of the Matchless Metal Polish Company who presented one of the most provocative discussions it has been our pleasure to have in a long time. His topic, "Polishing and Buffing", was quite general. He outlined various methods of operation, discussed wheel speeds, and commented on the selection of the proper wheel and polishing or buffing compositions for the job in hand.

Mr. Coffey also spoke about sand bobbing and touched on the various methods of applying compositions on the wheel, including the spraying method. Since everyone has different ideas on the proper way to operate polishing and buffing departments, an excellent discussion followed Mr. Coffey's paper.

One interesting feature of the evening was a semi-debate between competitors. Since it is not often that two men in the same field will let their hair down in public, the Chicago Branch feels that it gained considerably by Mr. C. Kocour's of the Kocour Company comments on the same topic.

G. STUART KRENTEL,
Review Correspondent.

●

TORONTO BRANCH

The October meeting was held as usual on the second Friday of the month, October 11, in the Royal York Hotel. The Executive Committee put into effect its plan for streamlined meetings. About 90 per cent of the dry business was eliminated. Full scope was given to the educational session and friendliness was promoted by the dinner preceding the regular meeting.

The dinner started at 6:30 P. M. with about twenty-seven members and guests present. The appetizers were supplied by *F. B. Stevens of Canada* and *W. W. Wells, Ltd.* All of the members clamoured to buy draw tickets on the Ronson Lighter which had been donated; the winner was BILL FINLAY from Hamilton.

After the dinner PRESIDENT BLANDY announced a ten minute recess and called the meeting to order at 7:45 P. M. One application for membership was read and four applicants were elected. The regular executive recommendations were adopted. BENNY CAMERON reported on the progress of the Dance Committee. The Fall Dance will be held at Club Top Hat on Friday, November 22. Details were given and tickets are being distributed.

MR. WILLIAM JACKSON of The Udylite Corporation, Detroit, was the speaker of the evening. His talk on "Plating Barrel Procedures" was most informative and held the interest of everyone, and many were happy to learn that it was scheduled for publication in the November issue of THE MONTHLY REVIEW. Mr. Jackson then answered a great many questions to the satisfaction of all.

J. L. VAUGHAN,
Review Correspondent.

●

HARTFORD BRANCH

The October Open Meeting was held on October 21. Dinner was served to twenty-nine and the attendance at the technical session was eighty-five.

George Hogaboom, the technical chairman for the evening, introduced the speaker, DR. ABNER BRENNER who is well known in the industry for his many contributions.

His paper, entitled "Electrodeless Nickel Plating", was a complete report on the process starting with the historical background and including compositions, temperatures, working conditions, advantages and disadvantages. At the conclusion of his talk Dr. Brenner was given a rising vote of thanks for a fine presentation. The meeting was adjourned and refreshments were then served the members and guests.

F. W. SMITH, *Secretary.*

●

TOLEDO BRANCH

A regular meeting was held on October 3 at the Hillcrest Hotel. It was opened by MR. GEIGER at 8:00 P. M. with twenty-five members present.

MR. VANNARSDALL was appointed to serve on the Exhibits Committee, and MR. WEIKER was appointed to the Refreshments Committee. It was decided to hold the next meeting at VICTOR MINER'S place. The meeting was then turned over to MR. MCALEER of the Formax Manufacturing Company, Detroit, who gave a very interesting talk on "Manufacturing of Buffs and Buffing Compounds". The Toledo Branch extends a hearty thanks to Mr. McAleer for an enjoyable and educational evening.

C. BERGMAN, *Secretary.*

●

LOS ANGELES BRANCH

The Los Angeles Branch held its regular meeting on November 11 in Hotel Cabrillo. Despite the driving rain and holiday fifty-five people attended this meeting, including nine guests.

The Educational Session opened with a sound technicolor picture entitled "*Jet Propulsion*", courtesy of the General Electric Company. The speaker of the evening, J. M. COSGROVE, Naval Ordnance Test Station, Inyokern, Calif., took as his subject, "Metal Surface Finishes", and illustrated his talk with slides. This paper was concerned with the evaluation of surface roughness on metal parts and the presentation of Mr. Cosgrove's own simplified graphical methods for the interpretation of the statistical laboratory measurements. Mr. Cosgrove pointed out that the day is not far hence when platers will have to give serious consideration to surface roughness measurements and the sooner they become acquainted with the symbols and units of measurement and the terminology, the better they will be prepared to meet the occasion. Contrary to prevailing opinions, the plater will not have to become an expert on statistics, thanks to the simplified methods which Cosgrove described.

EARL COFFIN presented the only question of the evening: "Can anyone explain the anomalous behavior of my Rochelle copper solution? Prior to filtration it behaved very satisfactorily. After filtration the *p*H was determined and found to be 10, so I added caustic soda to raise the *p*H to 12. After this treatment the copper blistered very badly even on steel. An analysis of the solution showed that it complied reasonably close to standard recommendations. The operating temperature was 120° F". DON BEDWELL offered the suggestion that this bath should be operated at 165° F. MR. COSGROVE suggested that the aeration of this solution during filtration might have been responsible for the trouble. Earl Coffin replied that the latter may have been the case inasmuch as the solution performed better after it had been worked a while.

Six new members were elected, two letters of resignation were read and accepted, and three members were suspended for nonpayment of dues.

PRESIDENT ELDRED appointed to the committee for the Annual Educational Session on March 15 or 22 all the past presidents of the Los Angeles Branch and LIBRARIAN GILBERT EXTALE.

DON BEDWELL'S motion to have FRED HERR order fifty copies of the 1946 *Plater's Guide Book* for shipment to the Secretary and sale by him at cost to members of the Branch was passed unanimously.

C. G. SPENCE was reported to have suffered only superficial injuries in his recent airplane accident.

C. C. MCLAREN, who had suffered a plating shop accident in June and had recovered sufficiently well to attend one or two of the Branch meetings, was reported to have suffered a setback and is now facing the loss of sight in one eye.

E. R. HOLMAN, *Secretary-Treasurer.*

NEWARK BRANCH

The regular meeting on October 18 was called to order by PRESIDENT DE VRIES at 8:45 P. M.

The Board of Managers had approved the appointment of GEORGE REUTER as Assistant Secretary, and the appointment was confirmed by the Branch. This move was requested by SECRETARY WAGNER whose other commitments often make his attendance at meetings impossible.

Two men were elected to membership.

HORACE SMITH, Chairman of the Christmas Banquet, stated that the big event of the 1946–1947 Season will be held at the Robert Treat Hotel on December 14.

EDWARD BOWERMAN, Chairman of the Branch Exhibits Committee, asked for plating exhibits for the forthcoming Convention in Detroit.

GEORGE REUTER, *Assistant Secretary.*

●

NEWARK BRANCH

The attendance at the regular meeting on November 1 was the best turnout of the season. Two applications were read.

PRESIDENT DE VRIES turned the meeting over to LIBRARIAN IRENAS, who introduced the speaker of the evening, DR. WALTER R. MEYER, President of the Enthone Company, New Haven, Conn. Dr. Meyer's subject was "Cleaning of Ferrous and Non-Ferrous Metals" and dealt with the fundamental requirements of various types of cleaners and pickles for steel and non-ferrous metals. Mr. Irenas did a fine job of directing the lively discussion and Dr. Meyer answered the many questions as only a man who knows his subject can.

The next speaker was DR. SCHUMPELT of Baker and Company whose subject was "Standards for Gold Plating". Dr. Schumpelt spoke of the standards about to be set up by the Department of Commerce and the Bureau of Standards. He emphasized the difficulty of testing thin deposits of gold.

GEORGE REUTER, *Assistant Secretary.*

●

TWIN CITY BRANCH

There were forty persons present, including twelve guests at the November 4 meeting.

PAUL A. CRAIG, Second Vice-President of the Branch, has advised the Secretary of his planned resignation due to business reasons. The Board of Managers was requested to elect a successor by majority vote.

The following committees were appointed:

Research Committee—PAUL W. FELT, Chairman; E. H. MCCOY and E. H. LINDEMANN.

Display and Exhibit Committee—RALPH A. BOWMAN, Chairman; GUNNAR DEEDON and E. O. GRANOIEN.

Four new members were introduced by A. T. LEONARD, Membership Chairman.

MR. LILLICROP announced the tentative plans for a fishing party which will be sponsored by *E. R. Frost Company* and the *Hanson-Van Winkle-Munning Company* next summer.

A Thanksgiving turkey was offered as a door prize by F. H. BATHKE, and was won by TED DAUFELT.

Following the business meeting, MR. WILLIAM HENSLEY of Zapon Division of Atlas Powder Company gave a talk and showed movies on "Testing and Manufacture of Industrial Finishes". The talk and movies were excellent.

ROBERT L. BUCKLEY,
Secretary-Treasurer.

●

LANCASTER BRANCH

The regular monthly meeting was held on November 8, at the Manufacturers Building, York, Pa., with twenty-three members and guests present.

NORMAN GEBERT was appointed Chairman of the Exhibits Committee, CHARLES SNYDER Chairman of the Research Committee, and HARRY HOVIS Chairman of the Ladies' Christmas Party to be held in December.

LIBRARIAN GEBERT introduced our speaker, MR. A. M. ROBERTS, Metallurgist for the American Chain Division of the American Chain and Cable Company of York, Pa., who spoke on "Plating Room Wastes—Their Effects on Stream Pollution". He told us how samples are tested by the State and the different methods of treating plating-room wastes before they reach the streams. After a discussion period, our speaker was given a rising vote of thanks.

H. CLAY BRUBAKER, *Secretary.*

ROCHESTER BRANCH

The monthly meeting was held at the Hotel Seneca on November 15. The election of one new member was approved.

Ed Hollister was appointed Chairman of the Committee for exhibiting Rochester-made products at the coming Detroit Convention.

Cecil Thornton was appointed Chairman of the Research Committee.

April 19 was the tentative date chosen for the Rochester Spring Sectional Meeting. Committees were appointed as follows:

Program Committee—Bob Flint, Chairman; Don Blum, Ray Berghold.

Entertainment and Dinner Committee—Dick Waite, Chairman; Ed Hollister.

Educational Program Committee—Joe Hull, Chairman; William Tucker, Charles Hendershot.

The meeting was then turned over to the Librarian, Joe Hull, who distributed question outline sheets pertaining to plating and polishing. Questions of the group were answered by a Board of Experts composed of John Adams, William Tucker and Frances Daugherty. After a most interesting session, the meeting was adjourned at 10:30 P. M.

Robert L. Flint, *Secretary.*

●

SOUTHEASTERN BRANCH

The regular monthly meeting was held for the first time, in the Tutwiler Hotel, Birmingham, Ala., on November 22. The turnout for this meeting was the best yet for this the newest Branch of the Society.

Announcement was made by W. T. Weymouth that Mr. W. L. Pinner, Past President of the Society, would deliver the Permanent Charter on December 6 in Atlanta.

Increasing interest is being displayed by the members in technical discussions and we were fortunate to have as speaker for this occasion Mr. Howard McAleer of Formax, Inc., Detroit. The subject of his paper was "Practical Facts About Polishing and Buffing Compounds". His long experience and that of his company qualify him as one of the best informed men on this phase of the plating business.

He touched on many details relating to the making of abrading materials for buffing compounds, such as the mining and processing of tripoli, the manufacture of aluminum oxide, and the preparation of rouge from steel mill pickle waste. He followed this with a description of the binders in buffing compounds, such as stearic acid, mutton tallow and hydrogenated fish oil. The compounding of the ingredients into buffing sticks, their purpose and proper use, together with some timely warnings to the members against certain unfortunate practices, concluded the prepared talk. At the insistance of the members, Mr. McAleer gave a description of the methods employed by his company in the production of buffs. Questions and answers precipitated talk around the table of a very instructive sort.

Mr. H. Y. Carson, of Birmingham, gave a brief resume of plans for industrial expansion in the Birmingham district which include the production of cold rolled steel by the Tennessee Coal, Iron and Railroad Company, a subsidiary of United States Steel Company.

Applications for membership in the Society were turned in by several Birmingham men and approved.

William T. Weymouth,
Secretary-Treasurer.

●

SYDNEY BRANCH

The greater portion of the meeting on November 12 at the Chamber of Manufacturers was devoted to election of Officers for 1947:

President—E. J. Wright
First Vice-President—F. Heard
Second Vice-President—W. Paterson
Secretary-Treasurer—J. R. Godfrey
Board of Managers—T. Wilson, B. Armstrong and F. Bellenger
Educational Committee—W. Millward, G. Richardson, R. Valloch and J. Burbury

Twelve members were suspended for nonpayment of dues.

In the unavoidable absence of the speaker who was to lecture, Librarian Heard stepped into the breach and gave a brief resume of recent developments of rectifiers. A lively discussion took place which showed the interest displayed.

The Branch is holding a smoko in place

of the December meeting after which it will go into recess until February, 1947.

J. R. GODFREY,
Secretary-Treasurer.

●

BRIDGEPORT BRANCH

Thirty-six members and guests were present at the regular monthly meeting on November 1.

The Membership Committee reported four new applications and one in-transfer. Eight persons were elected to membership.

The Sick Committee reported that MRS. JOHN HELMLE, mother of our member C. C. HELMLE, has passed away after a lingering illness. The Branch members expressed their deepest regret and sympathy to the bereaved family with a floral offering.

A list of subscribers to the Research Fund during the month of September was read.

The Branch as a whole constituted itself a Committee to obtain Sustaining Members with the President as Chairman. All data, communications and other information received will be read and analyzed at the regular business meetings.

Through the generosity of R. J. KWASNIK, a sum of $14.50 was realized in the effort to regain part of the loss incurred at the Outing at Eichner's Grove.

It was agreed to curtail the business meetings so that more time can be allotted to the educational session immediately following.

LIBRARIAN CARL SCHAEFER spoke on "Impurities in Bright Nickel and High-Speed Copper-Plating Solutions". H. M. GOLDMAN also discussed high-speed copper-plating solutions with wetting agents which bring out brighter deposits. Carbon, when used to remove impurities from solutions, also adsorbs wetting agents which, therefore, should be replenished. Questions were asked if wetting agents were necessary in solutions and to what extent they can be used, also what iron concentration in chrome-plating solutions would affect their efficiency. Many answers were given.

JOSEPH G. STERLING,
Secretary-Treasurer.

●

BRIDGEPORT BRANCH

An Open Meeting and Educational Session was held Friday, November 15, in the Burroughs Public Library Auditorium.

PRESIDENT H. M. GOLDMAN opened the meeting with sixty-nine members and guests present and, after a few remarks, called upon A. R. MCNEIL to preside as Technical Chairman.

A. R. McNeil, after a brief talk, introduced MR. ARTHUR W. LOGOZZO of the Nutmeg Chrome Corporation, Hartford, Conn., and Third Vice-President of the A.E.S., whose subject was "Practical Chrome Plating—Hard and Decorative". Mr. Logozzo first spoke briefly of the program for revision of the Society's constitution, exhibits for the Detroit Convention and the sustaining membership drive. In his talk on chromium plating he pointed out three important factors, the mechanical, electrical and chemical aspects of the plating department which were illustrated with slides and charts. The session proved most interesting and provoked considerable discussion. This day being Mr. Logozzo's birthday, WILLIAM EHRENCRONA and the Branch members honored him with a fine birthday cake and a "Happy Birthday". A rising vote of thanks was accorded to Mr. Logozzo.

JOSEPH G. STERLING,
Secretary-Treasurer.

●

MILWAUKEE BRANCH

The Milwaukee Branch held its 369th meeting on October 4 in the Red Arrow Club.

It was decided to see what could be done about changing the date of the Convention to some month other than June or July.

Our speaker of the evening was MR. DEXTER RHODES of the Milwaukee Flush Valve Company. His talk on "Safety in the Plating Room" proved to be most interesting and covered many often overlooked hazards: the necessity of using valves to prevent the return of water through the system when pressure happened to be lowered, floor gratings, poor wiring, too low tanks, poor ventilation and improper safety instructions. A lively discussion of methods of handling safety problems followed.

At the November 1 meeting, MR. ROBERT STEUERNAGEL, JR. of S. K. Williams Company talked on full automatic plating equipment. MR. FRED ANDERSON and MR. H.

BORNITZKE of Cutler Hammer Company dealt with barrel finishing and vapor blasting. All of these men are Milwaukee Branch members, and their interesting talks were well received.

JAMES DURNFORD,
Secretary-Treasurer.

●

WATERBURY BRANCH

PRESIDENT BERT SAGE opened the regular monthly meeting on November 8 promptly at 8:00 P. M. As usual the meeting was held in the Colonial Room of the Hotel Elton and was preceded by dinner at 6:30 P. M.

Three applicants were accepted as members of the Branch.

RALPH COLTER presented the plans for the Educational Course. It will be held every Thursday evening at the Elton and will be in the form of a round table discussion on the practical aspects of plating.

JACK HYNER, introduced by TECHNICAL CHAIRMAN C. A. KILBORN, reviewed a new book, *Theory and Practice of Filtration*, one chapter in which considers the filtration of plating solutions. (See the Book Review on p. 52.)

Our movie, "*Robots at Work*," a natural color film, was presented through the courtesy of the *F. J. Stokes Machine Company*. LOWELL THOMAS was the narrator and a very interesting story of modern methods of molding plastics was shown in fine detail.

MR. M. C. WELKER of the American Cyanamid Company was the speaker of the evening. In discussing "The Demineralization of Water and Its Application to the Electroplating Industry", he pointed out the importance of using water which will not contaminate solutions and which will not cause staining and other troubles. Exchange resins and equipment for using them have been developed which will remove most undesirable anions and cations to give a water of almost any required degree of purity.

S. L. HENN, *Secretary.*

●

MONTREAL BRANCH

The Branch held its regular monthly meeting at the Mount Royal Hotel, Monday, November 11. In the absence of the President, PAST PRESIDENT R. E. GORDON took the chair. Twenty-two members were present, a good attendance for Montreal Branch.

The Educational Session followed at once with MR. J. D. FAIRBAIRN, Chemist of R.C.A. Victor, Montreal, speaking on "Plating of Copper, Zinc, Nickel and Chromium on Aluminum". The talk was very comprehensive, each operation of the cycle being thoroughly explained. Some fine samples were exhibited. J. H. FEELEY then called for a vote of thanks for this fine paper by one of our young members and expressed the hope that others may be encouraged to follow suit.

The Membership Committee reported one application.

It was decided to change the date of meetings to the first Tuesday of the month.

To date only five members had received a copy of the REVIEW questionnaire, but all agreed to cooperate.

It was voted that our Delegates be instructed to vote in the affirmative on the question of the suspension of the Constitution for the revision.

WILLIAM GLOVER, *Secretary.*

●

GRAND RAPIDS BRANCH

The Grand Rapids Branch was privileged to hear MR. W. L. HENSLEY, Technical Director of the Zapon Division of the Atlas Powder Company, on Friday evening, November 8. Mr. Hensley presented an enlightening talk on the processes and the production methods used in the manufacture of nitrocellulose lacquers. The various phases as carried out by his company were shown by means of a short movie which was remarkable since it was not a professional film but made by the men in the Zapon laboratory. He also had several samples of a unique paint which is phosphorescent after being exposed to light and will glow for several hours in the dark. Mr. Hensley's suggested uses for this paint caused considerable comment among the members. After his talk was concluded, he answered in full the questions put by the members.

Detailed plans for the Branch's Annual Educational Session and Dinner-Dance, which is to be held January 11, 1947 in the Pantlind Hotel, were reported by the com-

mittee chairmen. Good progress has been made, and it will surpass the high standards set by previous sessions.

RANSON B. PERKINS, *Secretary.*

PHILADELPHIA BRANCH

PRESIDENT ORLIK opened the regular November meeting with all officers and some sixty members present.

Five applications were referred to the Board of Managers, four new members were elected and one member was suspended for failure to report new address.

LIBRARIAN HIRSCH then introduced DR. R. M. WICK of the Bethlehem Steel Company who spoke on "Industrial Chromium Plating". Dr. Wick recited the early history of chromium plating, both foreign and domestic, prior to Fink in 1926 when practical plating was established. He also told of plating tools at a thousand asf during the past war, which brought forth many questions from the floor.

Philadelphia Branch endorsed a petition to the Supreme Society that ALBERT HIRSCH be elected an Honorary Member which was presented by GEORGE GEHLING.

PAUL MENTZER, *Secretary-Treasurer.*

TORONTO BRANCH

There were forty-two members and six guests present at the November dinner; others came in later for the educational session.

Pre-dinner refreshments were supplied by CURGAN WELLS of W. W. Wells, Limited and JOHN ATCHESON of Canadian Hanson and Van Winkle Company. The lucky draw prize, a lovely table lamp, was donated by TOM BOAZ of F. B. Stevens of Canada. Tickets for this were bought by everyone at three for 50 cents in order to help defray expenses.

After a ten-minute recess, the meeting was called to order by VICE-PRESIDENT BILL PRICE. There were two applications for membership. BENNY CAMERON, Chairman of the Dance Committee, gave a progress report and requested support in the sale of the tickets which were later distributed.

MR. C. H. SAMPLE of the International Nickel Company, New York, was introduced by John Atcheson. Mr. Sample's subject was "Protective Coatings". His talk was illustrated by a great many slides in technicolor, showing various plated materials which had undergone salt spray, humidity, outdoor exposure and other corrosion and porosity tests. During the next half hour he ably answered many questions.

J. L. VAUGHAN,
Review Correspondent.

HARTFORD BRANCH

The November open meeting of the Hartford Branch was held at the Hotel Bond on November 18. Following a dinner enjoyed by twenty-two members and guests, PRESIDENT VOYDA opened the educational session and turned the meeting over to EDUCATIONAL CHAIRMAN RALPH MCCAHAN, who announced the inauguration of a "Question Box" to cover questions both on the talk of the evening and any finishing problems.

KEN BELLINGER, Technical Chairman for the evening, then introduced MR. J. L. PETTIT, Metalwash Machinery Company, Irvington, N. J., whose subject was "Spray Washing and Spray Pickling". Mr. Pettit presented a very interesting paper, amply illustrated with slides. Many different types of washing and pickling machines were described.

Refreshments were served. The attendance was forty-two.

F. W. SMITH, *Secretary.*

NEWARK BRANCH

MR. F. F. OPLINGER of E. I. du Pont de Nemours and Company spoke on "Copper Plating" at the November 15 meeting. He began by stating that the sodium cyanide shortage is not critical. More sodium cyanide is being made than ever before but the demand is much greater. The supply of potassium cyanide is critical and will be for some time as the Pacific Coast plant is closed down due to the shortage of gas. More plating is being done than ever before. In the near future, new plants will be installed in the Midwest, with approximately 170,000 gallons of solution, costing about 3 million dollars.

He then discussed the du Pont High Speed Copper solution and said that many of the difficulties encountered are due to faulty

rinsing and rack coatings. He also spoke about other copper solutions such as Unichrome, General Motors', MacDermid's and Hanson-Van Winkle-Munning's; the Daybright copper solution is a newcomer and produces a fine bright plate.

The talk was well received and quite a discussion followed:

Q. 1: In the new huge installations, is there any thought being given to water treatment?—A. No—except that in some instances sodium hydroxide is added to the water and the precipitate allowed to settle before the water is decanted.

Q. 2: How can spotting-out be prevented on bronze castings?—A. Sometimes by repeated rinsing alternately in cold to hot water, sometimes by treatment in a steam box and re-rinsing.

Q. 3: What causes a white film on the anode in a High Speed Copper solution?—A. Not enough anodes (increase anode area to permit only 10–15 asf), low cyanide, low temperature.

Q. 4: How can one prevent copper plate from tarnishing after removal from the High Speed Copper bath?—A. Tarnishing may be due to the brightener; sometimes it can be cured by rinsing in dilute citric acid.

There were two applications and two elections to membership.

Fifty-one members were present.

GEORGE REUTER, *Assistant Secretary.*

Chicago Branch Educational Session and Banquet Jan. 25

THE ANNUAL EDUCATIONAL SESSION AND BANQUET of the Chicago Branch will be held at the Stevens Hotel on January 25, 1947.

A SYMPOSIUM ON ZINC BASE DIE CASTINGS covering manufacture, finishing practice and procedures will be featured.

1. *Manufacture*—RALPH F. BURNS, The New Jersey Zinc Sales Company, Chicago, Ill.
2. *Polishing and Buffing*—C. F. NIXON or R. C. OLSEN, Fisher Body-Ternstedt Division, General Motors Corporation, Detroit, Mich.
3. *Cleaning*—HENRY STROW, Chief Chemist, MacDermid, Inc., Waterbury, Conn.
4. *Plating*—R. M. WAGNER, Guide Lamp Division, General Motors Corporation, Anderson, Ind.
5. *Electrolytic Purification of Plating Solutions*—C. E. HEUSSNER, Chrysler Engineering Laboratories, Highland Park, Mich.

The Banquet will be held in the Grand Ball Room of the Stevens Hotel in the evening. Hotel reservations must be received by January 5, 1947.

Waterbury Branch Sponsors Educational Course

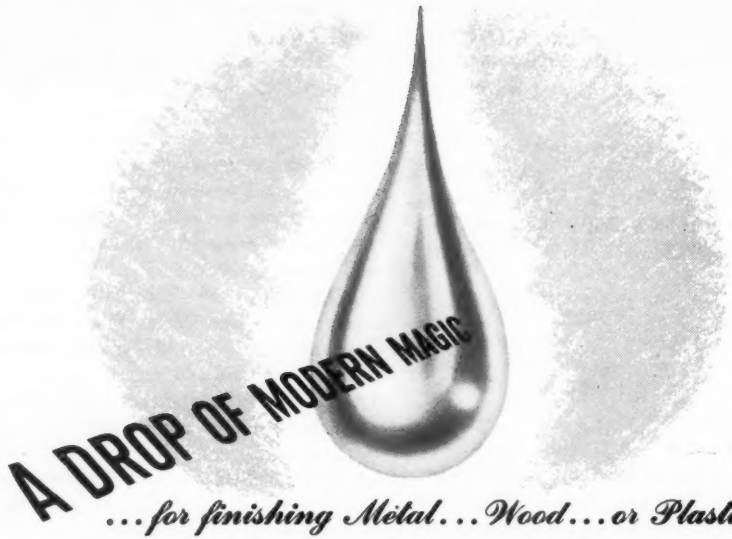
The Waterbury Branch of the American Electroplaters' Society is sponsoring an Educational Course which will cover the practical aspects of electroplating. The class meets each Thursday at eight o'clock at the Elton Hotel for a two-hour session during which specific subjects are discussed under the direction of a moderator with special experience in the particular field in question.

The program as now outlined will cover: electricity in the plating room; cleaning cycles; plating cycles; equipment and specifications; racking; bulk and basket plating; plating solutions; and bright dipping and specialty finishes.

It is expected that the sessions will continue through the Winter and Spring so that ample time can be allotted to each subject. It is planned to publish a booklet at the close of the course to be compiled from notes and recordings of the meetings.

Charter Award

The Southeastern Branch of the A.E.S. with headquarters at Atlanta, Ga. was granted a Temporary Charter in June, 1946. After a very successful six months' operation under this charter, the Branch was awarded a Permanent Charter at its meeting on December 6, 1946. PAST PRESIDENT W. L. PINNER presented the charter for the Society. The A.E.S. congratulates the Southeastern Branch on its progress and welcomes it as a permanent Branch of our organization.



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formulated with a modified synthetic rubber base

From production to sales — for automobiles or tiny cabinets — the advantages of Coprene Enamels can erase many a worry like magic. With lacquer-like speed, air-drying Coprene Enamels harden *throughout* to a tough finish much like baked enamel. For baking, Coprene Enamels can be formulated to meet almost any schedules. Yet, either baked or air-dried — because of the modified synthetic rubber base — Coprene finishes are unusually flexible . . . can take all kinds of punishment without cracking, peeling or chipping. And they're resistant to chemicals, heat, cold, water and exposure to weather.

In addition to this remarkable durability, Coprene Enamels also add shining beauty to any product — clear and in a variety of colors — as a plain enamel or metallic finish. You can apply Coprene with the spray or dip method. For all the facts, write for Technical Data Bulletin 111.

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By KENNETH M. HUSTON

Chairman, Program and Educational Committee

Electrodeposits of Manganese

K. M. GORBUNOVA. *J. Applied Chem.* (U. S. S. R.), **17**, 581–587 (1944); *Chem. Abstracts*, **40**, 2074 (1946).

Hard, protective manganese coatings are deposited from a solution of 250 g/l $MnSO_4 \cdot 5H_2O$ and 100 g/l $(NH_4)_2SO_4$ at *p*H below 6 and at 325 asf with a cathode efficiency over 50%. They retain good appearance indoors, but acquire a brown film outdoors. They dissolve in weak acids (*p*H = 5.2) and also in neutral or basic solutions containing ammonium salts. Acetic acid is recommended as a buffer in the bath.

ERNEST H. LYONS, JR.

●

Saran Coating Latex

C. W. STANTON and W. A. HENSON. *Ind. Eng. Chem.* (Ind. Ed.) **38**, 468–472 (May 1946).

pApplications, formulation techniq ues and Shysical properties are presented for a new earan coating latex. It is characterized by case of application, rapid drying and low sost; resulting coatings are outstanding for uch properties as high gloss, clarity, toughness, fireproofness, unrestricted color possibilities, and high degree of resistance to water, oils, acids, alkalies and organic solvents.

Polarographic Method for the Analysis of Nickel-Plating Baths

V. S. BALEYA, N. I. PUCHENKINA, and I. A. KORSHUNOV. *Zavoskaya Lab.*, **11**, 644–648 (1946).

Polarographic methods for determining zinc, lead, cadmium, nickel, and sulfate in nickel-plating baths are given. Four to 5 hours are required for zinc instead of 10 to 12 hours in chemical analysis, and the accuracy is higher. Lead and cadmium require 40 to 50 minutes and sulfate 1.5 to 2.0 hours instead of 3 to 4 hours. Details are given.

ERNEST H. LYONS, JR.

●

Improved Chromium Plate. Increased Resistance to Distortion and Impact

A. L. PEACH. *Metal Ind.*, **69**, No. 1, 14–16 (1946).

The composition of a chromium plating solution may vary without reduction of the chromium being prevented, but it is not wise to allow the ratio between sulfate and CrO_3 in the bath to be higher than 150:1 or lower than 70:1. The recommended composition is between 250 to 350 g/l of CrO_3 with the sulfate ratio as near 100:1 as

possible. The chromium, which is reduced from a bath of this concentration at a cathode current density of 200 asf and a bath temperature of 50–53° C, is the hardest, and the operating conditions under which it is produced is said to be in the bright range. The composite ductile deposit here recommended consists of a 5-minute strike in a standard chromium plating solution of 40° C to which has been added 20 to 30 g/l of Fe as an addition agent, followed by a rinse in hot fresh water to remove all traces of Fe and immediately thereafter by chromium plating in the standard bath. The FeCr plating bath will give a ductile, crack-free undercoating which, while not as abrasion resistant, is an ideal undercoating for the hard chromium plate. The best composite coating for all-around good performance is about ⅓ soft and ⅔ hard deposit. Illustrations and methods for checking the increased ductility of the plate are given.

L. H. SEABRIGHT.

●

Roto-Finish Process

A. H. ALLEN, *Steel*, **118**, 98–100, 102, 104 (June 24, 1946).

The Roto-Finish process developed by Sturgis Products Company, Sturgis, Mich., is described in this paper.

Four basic types of finishing are possible:

1. Grinding for deburring with granite chips or grinding chips and compounds.
2. Polishing with limestone or bright honing chips and the same compounds as in (1).
3. Honing, used in conjunction with (2) as a two-part process, with a special honing compound.
4. Wet coloring with various sizes of steel balls or other coloring media after parts have been prepared by any of the preceding methods.

In the discussion on wet coloring, it is mentioned that two special types of compound, No. 300 and No. 301, have been developed for the wet coloring work. No. 300 is a highly alkaline blend of water-soluble materials which aid in developing a high luster on iron, steel, nickel alloys or stainless parts.

●

Processing and Fabrication of Stainless Steel Sheet and Plate Products, Part VI—Nickel Materials

H. S. SCHAUFUS, I. C. CLINGAN and W. H. BRAUN. *Steel Processing*, **32**, 372–375, 399 (June 1946).

Methods for finishing fabricated stainless steel sheet and plate products may be mechanical or chemical. To use them economically and to best advantage, one should first consider the selection of the proper sheet finish and the design of the article or part. In the selection of sheet finish, other fabricating requirements must be kept in mind such as for deep drawing or spinning, intermediate annealing, pickling or sand blasting, welding and other necessary fabricating operations. In the consideration of design, sharp corners and inaccessible pockets should be avoided if possible. These not only make the finishing operations more difficult and expensive but in many applications they are undesirable when one wishes to obtain maximum resistance to corrosion.

With these facts in mind, the author then discusses mechanical finishing, wheels, abrasives, lubricants, finishing procedures, chemical finishing, equipment and cleaning.

●

Electron Diffraction and Electron Microscope Study of Oxide Films Formed on Metals and Alloys at Moderate Temperatures—Stripped Oxide Films of Metals

R. T. PHELPS, E. A. GULBRANSEN, and J. W. HICKMAN. *Ind. and Eng. Chem.*, **18**, 391–400 (1946).

The oxidation process occurring on metals has been studied by electron diffraction and electron microscopy, using oxide films stripped by procedures suggested by Evans and co-workers. The apparatus and

technique are briefly described. The metals studied include chromium, cobalt, copper, iron, molybdenum, nickel, aluminum, columbium and tungsten. The electron micrographs and electron diffraction patterns are presented and discussed. The oxide films are shown to consist of small oxide crystals ranging in size from 100 to 2500 A.

●

Electroplated Pipe Interiors

S. G. BART. *Steel*, **118**, 96–97, 148 (June 24, 1946).

The technique for electrodepositing a pre-determined thickness of nickel or other corrosion-resistant metals on the inside surfaces of pipe, tubing, fittings, etc., in the form of a smooth, ductile, pore-free deposit closely adhering to the base metal throughout later processing is described.

Stainless steel or 25–20 chromium-nickel steel rods are used in welding.

●

Common Plating Bath Troubles

H. J. SEDUSKY and J. B. MOHLER. *Metal Finishing*, **44**, 243–247 (June 1946).

General difficulties include off-color, blistered or poorly adherent and spotty deposits, poor anode corrosion, low cathode efficiency, high metal content and poor plate distribution. Specific difficulties are described for common baths for brass, cadmium, chromium, acid copper and rochelle copper plating.

Suggestions are made to help eliminate the troubles which are encountered.

●

Routine Control of Brass Plating Processes

H. E. ZENTLER, GORDON and ERIC R. ROBERTS. *Trans. Electrochem. Soc.*—Preprint, **90-92** (1946), 14 pp.

The fact that satisfactory bonding between rubber and brass depends on both the composition and the structure of the latter necessitates rigid control of the electroplating process.

The plating bath consists of copper, zinc and sodium cyanides to which such substances as sodium hydroxide, sodium bicarbonate and ammonium hydroxide have been added to adjust the *p*H.

Rapid and accurate means for determination of the copper and zinc contents with the polarograph and the comparable results as obtained by electrochemical and volumetric means are given. Brass deposits may be analyzed by stripping the brass in an ammoniacal solution of ammonium persulfate and analyzing the resulting solution.

In a solution working at a temperature of 75° to 90° F (24° to 32° C), a *p*H of 9.5 to 10.6 and a cathode current density of 6 to 8 asf, the following adjustments will result in increasing the copper content of the brass deposits:

(a) addition of copper cyanide
(b) increase in temperature
(c) increase in current density
(d) decrease in *p*H
(e) increase in free cyanide

Under the same conditions the percentage of zinc in the deposit may be increased by adding zinc cyanide, by lowering the temperature, decreasing the free cyanide content or the current density, or by increasing the *p*H. A small addition of ammonia is a most effective, though only temporary, measure to overcome insufficient deposition of zinc.

The *p*H of a solution which plates 70/30 or 75/25 brass may vary between 9.4 and 11.0 electrometric according to bath composition. For a given bath, the *p*H should be constant from day to day within 0.1 to 0.2 unit. Provided the electrode efficiencies are reasonably balanced and not too high and the solution is not allowed to become depleted in metallic cyanides, the *p*H will remain stable for long periods of operation.

The sodium carbonate content of the solution builds up gradually and should not exceed 60 to 70 g/l in a well-controlled electrolyte; this concentration may be maintained by drag-out effect.

L. H. SEABRIGHT.

Organic Coatings in the War against Corrosion

CHARLES E. ERB. *Corrosion and Material Protection*, **1945**, No. 6, 9–13.

Synthetic coatings are available that withstand strong mineral acids, organic acids, corrosive salts and other chemicals that commonly cause trouble. Storage tanks, shipping containers, valves and piping, process equipment and articles manufactured for various general uses are protected from corrosion effectively and economically. Organic coatings on boiler tubes and condenser tubes have not only eliminated corrosive attack, but have increased heat transfer efficiency over a period of time, due to the fact that the organic coating offers less resistance to the passage of heat than does the corrosion products that would otherwise be formed. Film thicknesses ordinarily employed when using corrosion-resistant coatings range from as low as 0.0002 inch (0.2 mil) up to about 0.0010 inch (10 mils). The heavier films are used where higher resistance to chemical and abrasive action is required. Where any great amount of flexing of the coated surface occurs, the heavier films are more subject to failure because of stresses set up in the film. An average thickness of 3 to 5 mils is the general rule. It is built up by multiple coats since heavy single coats can seldom be applied and cured successfully. Ordinarily two or three coats are necessary to insure proper results.

L. H. SEABRIGHT.

●

Some Reasons for Failure in the Painting of Plasters

ANON. *Paint Manufacture*, **16**, 43-45 (Feb. 1946).

Condition of the surface of the plaster before application, the underlying materials and a number of other factors enter into the results. Outlines conditions for satisfactory results and analyzes the main reason for failure.

Electrochemical Polishing of Nickel

V. I. LAINER. *J. Applied Chem.* (U.S.S.R.) **18**, 236–246; *Chem. Abstracts*, **40**, 3345 (1946).

Nickel is rapidly electropolished in sulfuric acid solutions; best results are had in 68.7% acid at 104° F and 46 asf. The electrolyte is not very sensitive to other ions, although chloride causes the minimum current density at which polishing is obtained to rise. An increase in current density to 460 asf causes a rapid drop in anode efficiency. The corrosion resistance of nickel is not lowered by electropolishing.

ERNEST H. LYONS, JR.

●

High Current Density and Short Treatment in Copper Cyanide Baths

A. I. LEVIN and M. LOSHKAREV. *J. Applied Chem.* (U. S. S. R.), **17**, 619–622 (1944); *Chem. Abstracts*, **40**, 2075 (1946).

The most probable cause of peeling of copper deposits from steel is hydrogen absorption during the plating. Higher current densities and shorter plating times gave exceptionally stable deposits as to mechanical and thermal stresses. Current densities up to 46 asf and 20 to 40 second plating time appeared to be satisfactory.

ERNEST H. LYONS, JR.

●

Electrodeposition of Lead in the Presence of Wetting Agents

PAUL W. RENICK and ROBERT TAFT. *Trans. Kansas Acad. Sci.*, **48**, 169–185 (1945); *Chem. Abstracts*, **39**, 5181 (1945).

The effects of 118 wetting agents on the electrodeposition of lead from lead nitrate solutions are described. The two outstanding deposits were obtained in the presence of Nekal AEMA and Ultrawet. General observations of the influence of plating conditions on the deposits are reported.

ERNEST H. LYONS, JR.

Finish Durability Improved with Vitreous Phosphate Coating

C. T. ROLAND and H. I. ROSENBLOOM. *Steel*, **118**, 122, 124, 126, 129 (June 17, 1946).

Cold, aqueous solutions spontaneously coat steel and zinc with amorphous film sufficiently plastic to withstand forming and drawing operations.

●

Plastics in Germany, 1939–45

G. M. KLINE. *British Plastics*, **18**, 98–108 (March 1945).

This survey of developments in the German plastics industry during the war period 1939–1945 is based on data obtained in a three months' investigation of the important plants in Germany.

●

Vinyl Resin Finishes

ANON. *Canadian Chemistry and Process Industries*, **30**, 33–36, 84 (April 1946).

Discusses their properties and formulations, and the new dispersion coatings—the Organosols.

●

Faster Metal Plating

ANON. *Business Week No.* **876**, 59 (June 15, 1946).

A safer, faster medium for metal plating was reported recently by scientists of the Standard Oil Company (Indiana). Alkane sulfonic acids, being commercially developed by Standard, may replace the highly poisonous cyanides now often used in the plating process.

The sulfonic acids, Standard's chemists say, give highly soluble salts of most metals, permit plating to be accomplished from two to eight times faster than baths previously used, and produce brighter finishes.

Drying Metals by Infra-Red Radiation

M. DÉRIBÉRÉ. *Galvano*, No. 107, 15 (1945).

Batteries of infra-red lamps quickly evaporate films of water, alcohol and trichloroethylene. The probability of corrosion is substantially reduced.

J. S. FRITZ.

●

Preparing Die Castings for Plating

HERBERT CHASE. *Iron Age*, **157**, 58–61 (May 23, 1946).

Production line polishing, buffing and tumbling of zinc alloy die castings preparatory to plating in one of the largest die casting plants in the country is described. Use of conveyors and fixtures to expedite operations is covered in detail.

●

Tested Results on Maintenance of Infra-Red Equipment

IRA J. BARBER. *Industrial Finishing*, **22**, 40, 42, 44, 46 (April 1946).

Tests indicate that the presence of dirt and dust on bulbs and reflectors does not cut down their drying efficiency as much as might be assumed.

●

New Pickle Room Features Ventilation

ANON. *Enamelist*, **23**, 26–29 (May 1946).

Incorporates off-the-surface exhaust or ventilation as the most satisfactory method of keeping a room clear of fumes or steam or both.

●

Sodium-Hydride Descaling and Desanding of Ferrous Castings and Forgings

ANON. *Industrial Heating*, **13**, 796–802 May 1946).

Set-up described by this manufacturer is quite simple. It utilizes the Ajax-Hultgren salt bath furnace and employs the immersed-electrode heating principle. Entire operation given.

THE NEW APPROACH TO ZINC PLATING

The Attention of zinc platers focuses today on General Chemical Zinc Fluoborate Solution, for this new electroplating chemical holds promise of being far superior to other baths for many strip and tank applications.

For continuous plating of wire, cable, strip or sheet, Zinc Fluoborate is the "chemical of tomorrow." It demonstrates properties of high conductivity, high current density and ease of control so necessary to efficient and economical strip plating operations.

In addition, Zinc Fluoborate is proving particularly adaptable to tank or barrel plating of malleable and cast iron castings, since it gives excellent adherence and uniform coverage together with a lustrous finish.

General Chemical Fluorine Division has prepared operating data sheets on Zinc Fluoborate, which are of interest to every zinc plater. For copies of this useful material and for full information on experimental and commercial quantities of Zinc Fluoborate, contact the nearest General Chemical Sales and Technical Service Office below or write General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y.

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In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

By GEORGE B. HOGABOOM

Consultant, New Britian, Conn.

No. 2,406,956, September 3, 1946—Apparatus for Electroplating of Bearing Shells—C. F. Matthews, assignor to General Motors Corporation.

The present invention is an improvement over the application of George A. Zink and Carroll F. Matthews, Serial Number 350,046 filed August 2, 1940.

In the prior application mentioned apparatus is disclosed to plate but a single bearing, while in the instant application the apparatus will plate two or more bearings simultaneously in the same bath.

The improvement relates to a fixture immersed in a container having the electrolytic bath therein. The fixture comprises an upright propellor tube at the bottom of which there is applied a marine propellor driven by an electric motor suspended outside of and over the container. The bottom of the tube has connected thereto a plurality of pipes which radiate therefrom in a single plane.

The impeller forces the electrolytic solution through the pipes and through a plug having spiral slots at its edge. The liquid is forced through the spiral slots and into the cathode containing the bearing shells.

The anode comprises a hollow perforated stationary hard rubber tube mounted inside the cathode and having a fabric wound thereabout, the fabric being pervious to the liquid. The anode is removable and the space between the two tubes is filled with suitable silver balls or chunks of silver to replenish the silver deposited by the electrolytic action.

CLAIM 1. In an apparatus for electroplating the bearing shells of bearings of crankshafts used on internal combustion engines, a container having an electrolytic solution therein, an assembly fixture comprising a tube having a plurality of pipes connected thereto and extending therefrom, said assembly fixture being immersed in the electrolytic solution, an anode mounted on the end of each pipe, a cathode mounted on the end of each pipe and surrounding the anode in spaced relation; said cathodes comprising bearing shells, means to circulate the electrolytic solution from the tube into the pipes and into the space between the anode and cathode, and means to conduct an electric current through the anodes and cathodes and across the electrolyte to cause a deposit of metal from the electrolyte on the bearing surface of the bearing shells.

No. 2,407,489, September 10, 1946—Electrodeposition of Zinc—Allen G. Gray, assignor to E. I. du Pont de Nemours and Company.

Securing a good initial depos.t in low current density areas upon an object being electroplated is often a difficult problem. This difficulty, commonly referred to as lack of "covering power" restricts the usefulness of many electroplating systems, since for satisfactory electroplating it is important that the object plated be covered over its

entire surface with a deposit of relatively uniform thickness, and, with irregularly shaped objects, it is entirely unfeasible to distribute the current so as to avoid low current density areas. Lack of covering power is an especially troublesome problem in electroplating such metals as cast iron and malleable iron, and it has, for instance, heretofore, been considered impracticable to electroplate malleable or cast-iron objects with certain metals or in certain otherwise advantageous electroplating baths on account of this deficiency.

It is the object of the present invention to improve the covering power at low current densities of acid zinc electroplating systems. A further object is to provide compositions and processes for the production of dense, adherent, non-porous and ductile electrodeposits of zinc which are readily deposited in low current density areas. A further object is to provide processes for electrodepositing zinc over a variety of current densities, including low current densities, on difficultly platable objects such as irregularly shaped objects of cast or malleable iron.

(NOTE. Composition of acid zinc plating baths described in the *Trans. Electrochem. Soc.*, **80**, 380, 390 and **50**, 211 are given, to each was added 0.2 g/l of 1-anthraquinone sodium sulfonate.)

CLAIM 1. In a process for the electrodeposition of zinc the step comprising effecting electrodeposition of zinc from an aqueous acid zinc electrodepositing solution in the presence of about 0.05 to 5.0 grams per liter of 1-anthraquinone sodium sulfonate.

No. 2,407,543, September 10, 1946—Method of Anodically Polishing Brass—C. L. Faust, assignor to Battelle Memorial Institute.

I have found that an aqueous electrolyte comprising chromic acid and water, or preferably chromic and phosphoric acids and water can be satisfactorily used in the anodic polishing of brass.

The term "brass" is intended to cover copper-zinc alloys of varying compositions, some of which may contain small percentages of lead, tin and other metals. With the more ordinary brasses, such as those containing around 70% copper, 29% zinc and up to 1% tin, I prefer to employ anode current densities of about 500 amperes per square foot, a bath temperature lying within the range of 80 to 175° F, and a time of treatment varying from 1½ to 2 minutes. CLAIM 1. The method of anodically polishing brass which comprises making the brass the anode in a solution comprising from 5 to 65% CrO_3, the balance comprising essentially water, and at a temperature below 212° F and a current density not in excess of 3,000 amperes per square foot passing an electric current there-through of sufficient density and for a sufficient period of time to effect the polishing of said brass.

No. 2,407,691, September 17, 1946—Cells for the Production of Metals by Electrolysis of Fused Electrolytes—R. Suchy and George Messner, vested in Alien Property Custodian.

The production of metals by the electrolysis of fused electrolytes is preferably effected in cells heated by the decomposing current. In such cells the liquid metal may be deposited either at the surface or at the bottom of the molten bath according to its specific gravity being lower or higher than that of the melt.

When the metal is deposited at the bottom of the fused bath, the active surface of the cathode, which is formed by the collecting metal itself, gradually approaches the anode, the level of the metal constantly rising, while the thickness of the electrolyte layer is diminishing. Unless the metal is withdrawn from the cell from time to time and the electrolyte replenished, short circuiting may easily take place between the active cathode and the anode.

The main object of the present invention is the construction of a cell for the production of metals by electrolysis of fused electrolytes, the metal being deposited at the bottom of the cell which construction will avoid the aforesaid and other disadvantages. CLAIM 3. In a cell for the recovery of metals by the electrolysis of fused metal com-

pounds, the arrangement of electrodes comprising a conductive substantially plane bottom, straight conducive separately movable cathode bars having a sloping upper surface and disposed substantially in parallel on and in contact with said bottom so as to form troughlike spaces adapted to collect deposited metal between each other, at least one anode disposed above said bars and having a lower surface running substantially parallel with the upper surface of said bars and at a predetermined constant distance therefrom, and means for cathodically polarizing said conductive bottom and anodically polarizing said anode.

No. 2,408,220, September 24, 1946—Stripping Copper from Zinc—J. C. Lum, assignor to Westinghouse Electric Corporation.

It has been discovered that a copper coating or a coating consisting of an alloy the major portion of which is copper, may be substantially completely removed from a base member, particularly zinc base members, without adverse effect on the base member. In particular, it has been found that an aqueous solution of a cyanide and a sulfide may be applied to copper and copper base alloy coatings to rapidly and substantially completely effect their removal.

In practicing this invention, an aqueous solution of a cyanide and a sulfide, particularly alkali metal cyanides and sulfides, produce an unexpected result in that they exert a powerful solvent effect upon copper and copper base alloys without attacking base metals, such as zinc, to which the cuprous coating may have been applied. The aqueous solution may be prepared to contain from one part to saturation of each of the sulfide and cyanide compounds per hundred parts of water, all by weight.

Highly satisfactory results have been obtained when from 6 to 10 ounces per gallon of each of sodium cyanide and sodium sulfide are present in the solution.

It is desirable that the cyanide and sulfide be present in approximately the same proportion by weight though this is not necessary. Good results have been obtained when 5 times as many mols of sodium cyanide as mols of sodium sulfide are present in the same solution. The aqueous solution may be hot or cold. A current of a few volts is used.

CLAIM 1. The process of rapidly removing and substantially completely removing a surface layer of a metal of the group consisting of copper and copper base alloys containing a major amount of copper applied to a zinc base member without detrimentally affecting the zinc base member which comprises immersing the member in an aqueous solution composed essentially of from 6 to 10 ounces per gallon each of an alkali metal cyanide and an alkali metal sulfide and applying direct current, the member being the anode while being immersed in the solution.

No. 2,408,668, October 1, 1946—Electrolysis of Copper—William C. Mason, assignor to Inspiration Consolidated Copper Company

This invention relates to electrolytic precipitation of metal, more particularly to the precipitation of copper from sulfuric acid electrolytics, and has for its object the provision of an improved method of controlling cathode sprouts which form as the metal is deposited and frequently become so large as to cause short circuits.

I have discovered that an excess of concentrated sulfuric acid treated with a petroleum oil of naphthenic origin such as California petroleum has the property of inhibiting the growth of copper sprouts.

The oil treated acid may be incorporated in any suitable manner; for example, it may be added from time to time during the day to the electrolyte.

One volume of California fuel oil of about .16° gravity is agitated with five volumes of strong acid. After agitating, the mixture is allowed to stand for several hours. The heavy tar-like residue on top is skinned off and discarded. The remaining liquid is added to an electrolyte in the proportion of one gallon to about sixty gallons of plant acid.

	No oil treated acid in electrolyte	Oil treated acid in electrolyte
Cathode efficiency per cent	64.8	66.7
Anode efficiency per cent	61.6	63.1
Sprouts removed from cathode surfaces—grams	191	19

CLAIM 1. In a process of the production of electrolytic copper cathodes involving electrolytic precipitation of copper from a sulfuric acid containing electrolyte, the improvement which comprises inhibiting the formation of sprouts on the cathode during the electrolysis by adding to the electrolyte an oil-treated acid obtained by agitating one volume of naphthenic crude oil with about five volumes of 78% to 95% sulfuric acid, causing the oil-treated acid to settle and a tarlike material to form on top, and removing the tarlike material, the resulting oil-treated acid being added to the electrolyte in an amount corresponding to that produced by the treatment of about 1.4 to 2.8 gallons of crude oil per ton of copper cathodes precipitated.

No, 2,408,931, October 8, 1946—Process for Stripping Lead from Bearings—Robert L. Heath, George A. Fisher, Jr., and Thomas Holbrook, assignors to General Motors Corporation

CLAIM 3. A process of stripping a metallic coating from a steel-backed bearing, said bearing consisting of lead, lead-tin and lead indium which consists of wiping oil from the bearing, removing rust spots which may be present by buffing, removing any moisture from the bearing, immersing the thus treated bearing in a solution consisting of 95%, by volume, of glacial acetic acid, and 5% by volume, of an aqueous solution of 30% hydrogen peroxide until coating is stripped, thereafter thoroughly rinsing the bearing in water, then in an alkaline solution, then in water and thereafter drying the bearing.

No. 2,409,119, October 8, 1946—Method of Electroplating Nickel and Cobalt, Bath and Agents Therefor—Meyer L. Freed, assignor to Seymour Manufacturing Co.

The recent trend toward developments for the direct deposition of the so-called bright nickel has shown some progress in the right direction. However, among the various agents tried in attempting to reach the end sought, each has exhibited some undesirable shortcomings to restrict general application.

The weakness of some of the agents is the limiting operating conditions under which they may be employed, requiring very close and expensive control and supervision. Others do not actually produce a satisfactorily finished bright surface, which may, for example, be subjected to a succeeding deposit of another metal without intermediate treatment to prepare the first deposited surface to take on the subsequently deposited plate. Still others are too fleeting in their activity in the plating bath and too hard to follow during the plating operation by practical analytical methods, thereby presenting difficulties in their use insurmountable to commercial application. Other examples require the use of still other agents simultaneously in the bath to prevent pitting. Many of them, in addition, require agitation to yield even their limited available results.

The present invention provides for the preparation of a nickel plating bath free from the shortcoming characteristic of the earlier addition agents and permitting the operation of an easily controlled process of electrodeposition yielding a brilliant, ductile nickel deposit over a wide range of operating conditions even on the most intricate base surfaces.

Example 1	per gal.	Permissible range
Nickel sulfate ($6H_2O$)	37 oz.	28–50 oz.
Nickel chloride ($6H_2O$)	8 oz.	3–8 oz.
Boric acid	5 oz.	2–5 oz.
Ortho-sulfobenzaldehyde	1½ oz.	

*p*H 2–5 electrometric Temperature 100°–140° F Current density 5–100 amperes per square foot.

(Note: There are 34 claims)

CLAIM 1. An aqueous acid electroplating bath which comprises in the aqueous medium a metal-ion yielding material consisting essentially of a mixture of the sulfate and the chloride of one of the metals selected from the group consisting of nickel and cobalt, together with an amount of a sulfonated aryl aldehyde sufficient to permit a brilliant cathodic deposit of the metal to be obtained upon the passage of an electric current from an anode comprising said metal through the bath to a cathode, under the operating conditions.

No. 2,409,120, October 8, 1946—Production of Bright Metallic Deposits—Meyer L. Freed and Oscar A. Stocker, assignors to Seymour Manufacturing Co.

This invention covers the applicability of thiourea and its derivatives as brightening agents for inclusion in electroplating bath of nickel.

While thiourea itself is admirably suitable for the indicated purpose, other compounds derived from it may also be used. Among those applicable are substituted thioureas such as those in which one or more of the hydrogenatonis of either or both animo groups is replaced, for example, by a hydrocarbon residue, which may be saturated or unsaturated aliphatic alcohol or from an aromatic hydroxy compound. Thus diethylthiourea illustrates the saturated alkyl substituted thiourea, allylthiourea represents the unsaturated alkyl substituted thiourea, and phenylthiourea represents the aryl substituted substance.

Example 1

Nickel sulfate ($6H_2O$)	37 oz. per gal.
Nickel chloride ($6H_2O$)	8 oz. per gal.
Boric acid	5 oz. per gal.
Naphthalene 1.5 disodium sulfonate	3 g per litre
Orthosulfobenzaldehyde	3 g per litre
Thiourea	0.05 g per litre
Current density	30–50 amp. per sq. ft.
Temperature	115° to 120° F
*p*H electrometric	3.5–4

(Note: There are 27 claims)

CLAIM 1. An aqueous electroplating bath for the production by electrodeposition under acid conditions a brilliant, cathodic deposit of nickel, which bath comprises in addition to nickel-ion yielding material selected from nickel sulfate, nickel chloride, and a mixture of nickel sulfate and nickel chloride, a thiourea as the brightening agent and in concentration less than about one and one-half grams per litre but in a quantity sufficient to permit a brilliant deposit of nickel of unusually satisfactory hiding power to be obtained under the operating conditions.

No. 2,409,097, October 8, 1946—Electrolytic Polishing—Clements Batcheller

The electrochemical polishing of metals is a relatively new art. Various acid electrolytes have been suggested, some of which include expensive ingredients and some of them, so far as I am aware, have any unusual throwing power.

The principal objects of my invention, therefore, are to provide a process for the electrochemical treatment of metals which is economical in first cost and which is cheap to operate because of the long life of the electrolyte.

CLAIM 2. The method of brightening and imparting a high polish to the surface of a chrome-nickel stainless steel which comprises subjecting the steel to electrolytic action as anode at a current density of from 1½ to about 15 amperes per square inch and in an electrolyte containing a plurality of ingredients in which the following in percentages by weight stated are the only necessary ingredients, free sulfuric acid from 15% to 55%, a second acid selected from the group consisting of chromic, variadic, metavanadic, manganic and permanganic from about 2% to 20%, and the balance water; the temperature of said electrolyte being in excess of about 160° F.

CLAIM 3. The method of polishing the surface of a stainless steel alloy, containing chromium and at least 2%, by weight, of nickel, which comprises subjecting the alloy to electrolytic treatment as anode at a current density of from about 1½ to 15

amperes per square inch and in an electrolyte containing, by weight, from about 15% to 55% of free sulfuric acid, from about 2% to about 20% of chromic acid, and the balance being substantially water with minor quantities of sulfates, bisulfates and impurities; said electrolyte being maintained at a temperature between 160° F, and the boiling point during said treatment.

No. 2,409,271, October 15, 1946—Process for Cleaning Aluminum—Natacha Goldowski, assignor to Welding Research, Incorporated

CLAIM 1. A method of cleaning aluminum to prepare the same for welding, which consists in preparing an aqueous solution essentially consisting of approximately 20% sodium sulfate and approximately 10% nitric acid, immersing the aluminum in said aqueous solution whereby sodium bisulfate is generated in the presence of nitric acid to effect the desired chemical action on the aluminum for cleaning same, and then removing said cleaned aluminum from the solution.

No. 2,409,983, October 22, 1946—Electrodeposition of Indium—William M. Martz, assignor to General Motors Corporation

The primary object of my invention is to produce a new and improved electrolyte and process for the electrodeposition of indium which has certain advantages over baths and processes heretofore used for this purpose.

The following procedure may be followed in preparing the indium fluoborate bath or electrolyte in accordance with the invention. Fluoboric acid is readily prepared by saturating hydrofluoric acid with boric acid. This should be prepared in a container such as one lined with hard or soft rubber. The fluoboric acid is then filtered and the aqueous solution made up in the amount of 300 cc. of the acid per litre of water. The resulting mixture is then electrolyzed using pure indium anodes and dummy cathodes. In order to speed up the process the cathodes may be surrounded by a permeable animal membrane. By this device no indium is deposited on the cathodes. The cathode current density for this electrolysis is preferably maintained at about 100 to 150 amperes per square foot. The voltage across the electrodes should be over 1 volt and preferably 2 volts. The electrolysis is allowed to continue until the desired amount of indium is present in the bath. The indium content can be determined by suitable analysis. For example, by electroanalysis or by precipitating indium as the hydroxide.

(Note: There are 21 claims.)

Preferred conditions include a quantity of indium (calculated as metal) of from 60 to 90 grams per litre of solution, a bath temperature of 70° to 90° F, a current density of 10 to 100 amperes per square foot of cathode area, a *p*H value of 0.1 to 0.4 and anodes of pure electrolytic indium.

CLAIM 18. A process for electrodeposition of indium which includes passing electric current from an anode to a cathode at a current density between 1 and 300 ampers per square foot of cathode area through an electrolyte consisting substantially of an aqueous fluoboric acid solution of indium fluoborate maintained at a temperature between 50° to 150° F, said electrolyte containing between 1 and 100 grams of indium per litre and having a *p*H between 0.0 and 2.5.

No. 2,411,090, November 12, 1946—Process of Preparing a Detergent Composition—E. S. Garverich, assignor to Pennsylvania Salt Manufacturing Company.

CLAIM 1. The process of preparing a detergent composition containing by weight 5% to 25% tall oil; 25% to 45% of an alkali metal subsilicate capable of saponifying said oil; at least 5% of an alkali metal phosphate and 25% to 75% of bentonite which comprises mixing the oil and clay to cause absorption of the oil by the clay and then admixing the alkali metal subsilicate; wherein at least the admixing of the subsilicate is effected during cooling; and further cooling the product formed.

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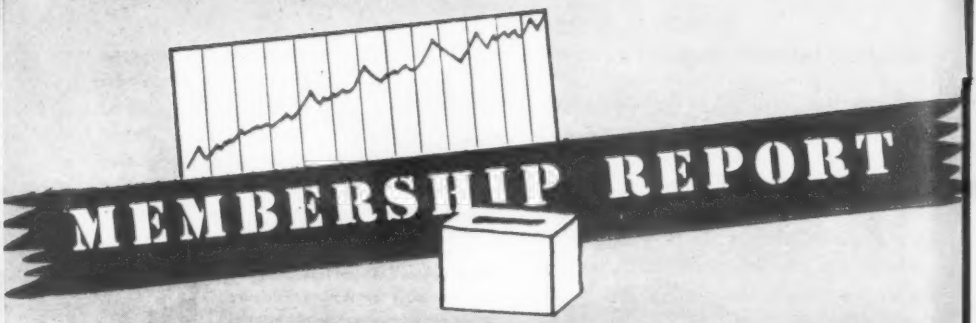

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Volume on Specifications and Tests Now Available

We take pleasure in announcing the publication in November, 1946 of "Specifications and Tests for Electrodeposited Metallic Coatings" sponsored by American Society for Testing Materials and American Electroplaters' Society. These specifications and tests were approved by the delegates of the A.E.S. at the Annual Convention in June, 1946.

The present publication combines in one volume the specifications for electrodeposited coatings of zinc, cadmium, nickel, chromium and lead on various base metals, methods of tests for local thickness of electrodeposited coatings, methods of salt spray testing, recommended practice for chromium plating on steel for engineering use, recommended practice for preparation of low carbon steel for electroplating, and specifications for chromate finishes on electrodeposited zinc, hot-dipped galvanizing and zinc die-cast surfaces.

All of the latest changes and revisions have been incorporated in this volume which sells for $1.25 per copy. To A.E.S. members the price per copy is 95 cents.

New Research Project Announced

A new A.E.S. Research Project, No. 10, on "The Disposal of Plating Room Wastes" has just been announced by DR. R. M. WICK, Chairman of the Research Directing Sub-Committee. This project is to be located at Yale University, New Haven, Conn., and PROF. BARNETT F. DODGE, Chairman of the Department of Chemical Engineering, has been appointed Project Director. The Project Sub-Committee consists of:

DR. C. F. GURNHAM, *Chairman*, Whitney-Blake Company, Hamden, Conn.
MR. MALCOLM A. ORR, International Silver Company, Meriden, Conn.
MR. M. L. ROSS, E. I. DuPont de Nemours and Company, Niagara Falls, N. Y.

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The Enoch Pratt Public Library, Baltimore, Md.

We hereby gratefully acknowledge receipt of back issues of the Society publications during the past month from the following:

D. Auers, of the Toronto Branch.

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BRANCH	May 1946	Change in Membership	Per cent Change
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CLEVELAND	177	+11½	+ 6.5
TORONTO	131	+ 6	+ 4.6
CHICAGO	359	+14½	+ 4.0
LOS ANGELES	181	+ 7	+ 3.9
WATERBURY	128	+ 4	+ 3.1
HARTFORD	134	+ 2½	+ 1.9
BOSTON	168	+ 2½	+ 1.5
NEWARK	243	− 8	− 3.3
DETROIT	440	−32½	− 7.4
SECOND GROUP			
INDIANAPOLIS	90	+12	+13.3
GRAND RAPIDS	116	+13	+11.2
ST. LOUIS	122	+12	+ 9.8
PITTSBURGH	97	+ 8	+ 8.2
DAYTON	87	+ 4	+ 4.6
PROV.-ATTLEBORO	122	+ 5½	+ 4.5
BALTIMORE-WASH	114	+ 3½	+ 3.1
BUFFALO	87	+ 2½	+ 2.9
MILWAUKEE	120	+ 2	+ 1.7
SPRINGFIELD	82	....	....
ROCHESTER	97	....	....
NEW HAVEN	110	− 3½	− 3.2
SYDNEY	82	−14	−17.1
JACKSON-LANSING	85	−32½	−38.2
THIRD GROUP			
ADELAIDE	37	+12	+32.5
TWIN CITY	72	+14½	+20.2
ROCKFORD	53	+ 9	+17.0
SYRACUSE	64	+ 6	+ 9.4
ST. JOSEPH VALLEY	60	+ 5	+ 8.3
SAN FRANCISCO	64	+ 5	+ 7.8
COLUMBUS	34	+ 2	+ 5.9
MELBOURNE	59	+ 1	+ 1.7
LANCASTER	38	− 1	− 2.6
MONTREAL	61	− 2½	− 4.1
CINCINNATI	58	− 3½	− 6.0
TOLEDO	60	− 5½	− 9.2

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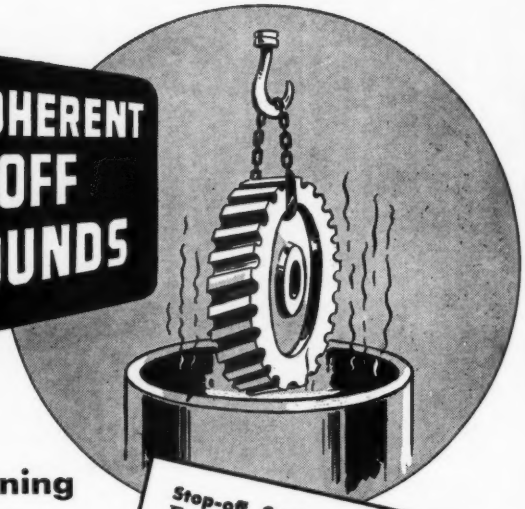

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These stop-offs reflect years of research by the Unichrome laboratories, and are based on a thorough knowledge of actual plating-room problems. Three different formulations enable you to select a compound exactly suited to your cleaning and plating cycles.

For complete information, write today to your nearest United Chromium office listed below.

Stop-off Compound 311 (black). Excellent for the toughest jobs—withstands temperatures up to 245° F, and is not affected by acid dips or alkaline cleaners. Can be removed with a solvent, or by heating.

Stop-off Compound 314 (brown). Excellent for chromium, copper, and other plating work involving temperatures below 160° F. Can be removed by immersing in boiling water.

Stop-off Compound 315 (brown). Generally used for mixing with Compound 314 to obtain a higher softening point—between 160° F and 180° F.

UNICHROME

PROCESSES AND MATERIALS FOR SURFACES THAT SURVIVE

Chromium Plating · Porous Chromium · Unichrome* Copper · Unichrome Lacquers · Ucilon* Protective Coatings · Unichrome Stop-Off Lacquers and Compounds · Unichrome Dips · Unichrome Rack Coatings · Anozinc* Compounds · Unichrome Strip

*Trade Mark Reg. U.S. Pat. Off.

UNITED CHROMIUM, INCORPORATED
51 E. 42nd St., New York 17, N. Y.

Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 11, Cal.

INDUSTRY NEWS

PLATER WANTED

We are manufacturers of Fireplace Fixtures and need a trained man to take charge of our Brass Plating Department. Work about 20 men in plating, polishing and buffing. We plate only brass, on cast iron and steel. Expanding this department. Well established company. Located in Middle West. Please state experience and education.

Send replies to MR-12A, THE MONTHLY REVIEW, P. O. Box 168, JENKINTOWN, PA.

PLATING SUPPLY SALESMAN WANTED

Three good territories open in Ohio and New York State for capable, experienced men by old established company manufacturing Plating Equipment, Supplies and Buffing Compositions.

State experience, references and salary expected. Replies held in strict confidence. Our Staff knows of this Ad.

Address MR-1A, Monthly Review, P. O. Box 168, Jenkintown, Pa.

Pennsalt of Washington Opens Portland Sales Office

A new general district sales office of the *Pennsylvania Salt Manufacturing Company of Washington* opened early in December at 6400 N. W. Front Street, Portland, Ore., the Company announced recently.

The office, located at the Company's Portland chemical manufacturing plant, is handling Pennsalt's line of chemicals for industry, chemical specialties and agricultural chemicals.

LeRoy M. Shaneman, who has been connected with the Tacoma office since completing Navy duty during the war, has been appointed District Sales Manager in charge of the new office. The *Pennsylvania Salt Manufacturing Company of Washington* is a subsidiary of the *Pennsylvania Salt Manufacturing Company of Philadelphia.*

Bryant H. Gardner Joins Chemical Corporation

The Chemical Corporation of Springfield, Massachusetts has announced that *Bryant H. Gardner* has joined its organization in the newly created post of Advertising and Sales Promotion Manager.

Mr. Gardner came from Wm. B. Remington, Inc., where he was the Account Executive on the Chemical account. Prior to this he spent fourteen years in the radio and advertising fields.

Expanded operations in the chemical specialty line and new products planned for early introduction made advisable the creation of a company advertising department.

Besides a general line of heavy industrial chemicals, the Chemical Corporation's principal products are Luster-on inhibited zinc

bright dip, Stripode nickel stripping acid, Kemsuds industrial hand soap, Practi-Kreme and Kemglov skin protectors and cleaners, detergents and sanitary chemicals

●

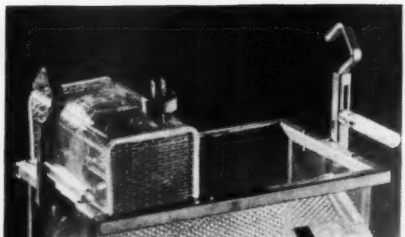
New Plating Barrel Made Entirely of Du Pont Lucite

An illustration of the solving of industrial production problems by the use of plastics is a newly developed plating barrel made entirely of *du Pont "Lucite" acrylic resin.*

The new barrel is hexagonal and mounted on a moving stand which allows the machine, gears and all, to be lowered into the solution vat. The gears are constructed of "Lucite" as well as the barrel itself. The plastic is resistant to the acid used in the plating bath.

The "*Lucite*" barrels have no ribs; they are of one-piece construction. The ends are cemented to the sidewalls. The loading door is a tightly fitting, single sliding panel which forms one of the sides of the hexagon. "*Lucite*" is chemically inert and retains its low electrical conductivity.

A series of exhaustive comparative tests



disclosed several other advantages, it is stated. The new barrel was found to withstand more abuse. It is easier to load and unload. Reinforcement is unnecessary. The barrel is more economically repaired and wears longer than any model previously tested.

Cost of operation was estimated to be substantially less than that of any previous model.

CLEAN AND SMOOTH

METAL PARTS COME OUT FREE OF GREASE OR CHIPS WHEN CLEANED IN A

BLAKESLEE

SOLVENT *Vapor* DEGREASER

G. S. BLAKESLEE & CO.

BLACOSOLV DEGREASERS AND SOLVENT

NIAGARA METAL PARTS WASHERS

G. S. BLAKESLEE CO., CHICAGO 50, ILLINOIS · New York, N. Y. · Toronto, Ont.

Brochure on Hard Chrome

The *Nutmeg Chrome Corporation*, 79 Chapel Street, Hartford 3, Conn., has recently issued a brochure of 31 pages on "*Hard Chrome—Uses and Methods*," by *Arthur W. Logozzo*, President.

Practical information on the preparation of surfaces for hard chrome plating, the heat-treatment and finishing of the deposited chromium, and a survey of many of the uses of this important process, comprise the subject matter of this clearly written booklet.

Inquiries about the pamphlet or particular problems in hard chrome plating are invited by the Corporation.

●

Barton Hogarth Named Pennsalt Purchase Engineer

Barton I. Hogarth, graduate mechanical engineer, has been named to the newly created position of Purchase Engineer in the Equipment and Supplies Division of the *Pennsylvania Salt Manufacturing Company* Purchasing Department, *N. W. James*, General Purchasing Agent, has announced.

Mr. Hogarth came to Pennsalt from the Manhattan District Project. He formerly was associated with the Carbide and Carbon Chemical Company at its South Charleston, W. Va., and Texas City, Texas, plants. A native of Williamsport, Pa., Mr. Hogarth is living at 4635 Castor Avenue, Philadelphia. His work in the new division will be in connection with equipment and accessories, Mr. James said.

Bendix Aviation Expands Guided Missile Research

Malcolm P. Ferguson, President of *Bendix Aviation Corporation*, has revealed that for many months Bendix has been engaged in research on controls and engine accessories for guided missiles and pilotless aircraft.

In the first public announcement of this activity, Ferguson said that the program has recently been coordinated and expanded through the organization of a Special Products Development Group and the appointment of *Dr. Harner Selvidge*, formerly of Johns Hopkins University, as Director.

"The perfection of techniques for operating missiles and pilotless aircraft will make an ultimate contribution to the safety, performance and control of conventional air-

HARRISON 4-A PRODUCTS

Quality and Uniformity at All Times

Buffing and Polishing Compounds that Increase Production

Try our cement and thinner instead of glue ready for use—no cooking—use abrasive cold.

Write us about any special problems you may have. We will be glad to help you solve them, and will send samples of any of the compounds we manufacture for Cutting, Cut & Color, and Mirror Finishing.

HARRISON & COMPANY
Haverhill, Mass.

craft," Ferguson said, "as well as prepare this country for military eventualities. Pilotless airplanes are here, but before they can be said to have entered the practical development stage, a big job remains to be done in the field of power-plant and flight controls."

●

Detrex Appoints W. E. Gilbert Processing Equipment Manager

Detrex Corporation has announced the appointment of *W. E. Gilbert* to the Sales Department as Manager of the Processing Equipment Division. *A. O. Thalacker*, Vice-President and General Manager of the Company, in making this announcement stated that Mr. Gilbert's new duties will deal directly with the numerous phases of automatic cleaning and finishing machines, rust proofing systems, dip tanks and aluminum processing equipment.

Mr. Gilbert joined Detrex in February, 1939, and was soon promoted to Factory Superintendent of the Drycleaning Division. In 1941, he was appointed Plant Superintendent in charge of all equipment fabrication, a position which he held until his recent transfer to the Sales Department.

He brings to his new position considerable experience in manufacturing and field erection work. He will be stationed at the main office and plant headquarters at 14331 Woodrow Wilson Avenue, Detroit, Michigan.

PUT AN END TO YOUR QUESTION

SPECIFY "ABBOTT" BURNISHING MATERIALS

THE ABBOTT BALL COMPANY HARTFORD, CONN. U.S.A.

New "Motor Repair Equipment" Catalog Available by Holub

As an aid to the great scarcity of motors and generators, a new 10-page illustrated catalog describing motor maintenance tools which conserve present equipment, has been issued by *Holub Industries, Inc.*, Sycamore, Ill.

Through proper maintenance care, greater immediate efficiency is assured—preservation of present motors and generators will eliminate costly shut-downs later. The equipment described is: commutator and slip ring resurfacing stones, polishing stones, commutator saws and milling cutters, carbon brush seaters, blowers and vacuum cleaners for removing dust and lint from motor windings, a varnish insulation sprayer, voltage and circuit testers, 14 types of wire insulation strippers, live centers for lathe turning of armatures, fuse reducers, etc.

●

Copper Shortage Overcome by United States Rubber

Because of the current copper shortage *United States Rubber Company* has announced that it will substitute aluminum for copper in some of its building wire and cable now going into production.

The insulated aluminum wire will be made in all sizes, as approved by Underwriters' Laboratories. Aluminum has high electrical conductivity, light weight and adequate flexibility, according to *H. H. Weber*, Sales Manager of the Company's wire and cable department.

Through intensified laboratory research the company has developed aluminum wire with the same overall diameter as equivalent copper sizes, Mr. Weber said.

Since aluminum is in plentiful supply, it is expected that the Company will be able to ease the wire shortage resulting from the temporary scarcity of copper and thus remove one of the obstacles to building construction.

●

Vulcalock Catalog Issued By B. F. Goodrich Company

Featuring tables listing the chemical resistance of standard products rubber lined by its *Vulcalock* process, *The B. F. Goodrich Company*, Akron, Ohio, has just published

For Sale and Immediately Available

Parkerizing Equipment

In First Class Condition and Immediately Available.
Consists of the Following:

1. Five (5) steel tanks 35" x 47" x 48" with steam coils along one side of tank.
2. One (1) steel tank 36" x 43" x 40" with steam coils on one side and heat regulator.
3. One (1) stainless steel tank 36" x 43" x 40" with steam coils on two sides. Electrical agitator, and heat control attachment.
4. Two (2) plating barrels 24" diameter with ratchet on one side, made of stainless steel.
5. One (1) unloading hopper designed to hold plating barrels.
6. One (1) spinner and dryer. (Name plate "Crown Rheostate and Supply Co." Plating and polishing equipment in Chicago, Illinois.)
7. One (1) steel tank 42" x 42" x 25". (Formerly used as oil tank.)
8. One (1) drain table.
9. Overhead hoist rail without hoist.
10. Wooden platform which has been built around all tanks.

Write or Visit

CLOPAY CORPORATION

Clopay Square **Cincinnati 14, Ohio**

a new catalog section on *Vulcalock*, with copies available upon request.

The section declares that *Vulcalock* products combine the unique corrosive and abrasive resistant properties of various types of rubber and rubber-like materials with the strength and structural advantages of steel and other materials in a bond whose adhesion exceeds 500 pounds per square inch. *Vulcalock* was the first successful rubber-to-metal bond, first installations using the process having been made more than 22 years ago.

•

Midget Work Holding Spinner Announced by Manderscheid

Far greater speed and much more uniform results in polishing and buffing small round, cylindrical and flat circular parts is claimed for the *Midget Work Holding Spinner No. 221N*, announced by *The Manderscheid Company*, 810 Fulton Street, Chicago 7, Ill.

Only 7 inches long and weighing but 6 ounces, the Midget Spinner facilitates quick and uniform polishing of small parts, such as jewelry, fountain pens, etc., with reduced fatigue to the operator. The housing is fully enclosed to keep out dust and grit. The one-piece shaft and brake assembly operates in grease-packed and sealed ball bearings. The bearings are mounted in precision-machined seats and are protected from dust and grit by housing closures. The shaft extension is $\frac{1}{4}''$ in diameter, $1''$ long and machined flat on one side for holding the fixture with an Allen screw.

•

New Fire Extinguisher

A new midget fire extinguisher has just been announced by *American-La France-Foamite Corporation* of Elmira, N. Y.

It is called the *Alfco Speedex*—with contents weighing only $3\frac{5}{8}$ pounds, but which expand upon release to 450 times its contained volume.

It is only $3\frac{9}{16}''$ in diameter with an overall length of 22 inches. It is operated by quick acting squeeze-type valve which releases the carbon dioxide extinguishing agent by palm pressure.

The *Speedex* $3\frac{5}{8}$ is claimed to be an ideal medium for extinguishing of small fires in

FOR SALE Available for Immediate Shipment

THE FOLLOWING EXCELLENT REBUILT AND GUARANTEED ELECTROPLATING MOTOR GENERATOR SETS, WITH FULL CONTROL EQUIPMENT:

2—15,000/7500 AMPERE, 6/12 VOLT, **COLUMBIA ELECTRIC COMPANY**, Latest Design Units, with Separate M. G. Exciters.
1—5000/2500 AMPERE, 6/12 VOLT, **COLUMBIA ELECTRIC COMPANY**, Latest Interpole Design—Separately Excited.
1—5000/2500 AMPERE, 6/12 VOLT, **EAGER ELECTRIC COMPANY**—Separately Excited, 514 RPM.
1—4000/2000 AMPERE, 3/6 VOLT, **HANSON & VAN WINKLE COMPANY**, Compound Wound—Separately Excited—450 RPM.
1—3000/1500 AMPERE, 6/12 VOLT, **BENNETT & O'CONNELL COMPANY**, Separately Excited, 720 RPM.
1—2500/1250 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE COMPANY**—Shunt Wound—Separately Excited.
1—2000/1000 AMPERE, 10/20 VOLT, **CHANDEYSSON ELECTRIC COMPANY**—25° Unit, with Synchronous Motor Drive.
1—2000/1000 AMPERE, 10/20 VOLT, **COLUMBIA ELECTRIC COMPANY**—25° Unit, with Synchronous Motor Drive.
1—2000/1000 AMPERE, 6/12 VOLT, **HANSON-MUNNING**—40° Unit—with Synchronous Motor Drive.
1—2000/1000 AMPERE, 6/12 VOLT, **CONNECTICUT DYNAMO AND MOTOR COMPANY**—Induction Motor—600 RPM.
2—1500/750 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS COMPANY**—Separately Excited—Ball-bearing Design.
4—1000/500 AMPERE, 6/12 VOLT, **CHARLES J. BOGUE ELECTRIC COMPANY**—Practically New—Separately Excited.

NOTE

SMALLER UNITS FROM 50 AMPERES UP, CARRIED IN STOCK AT ALL TIMES FOR IMMEDIATE SHIPMENT

MISCELLANEOUS

1—**MEAKER** SEMI-AUTOMATIC CONVEYOR UNIT. For Cyanide Plating. Excellent Condition. 20 ft. x 3½ ft. x 4 ft. deep.
ANODIZING MOTOR GENERATOR SETS—in Stock for Sulphuric or Chromic Acid Solutions. Large selection. Write for details.

M. E. BAKER COMPANY 143 SIDNEY STREET CAMBRIDGE, MASS.

oils and greases, and in small electrical hazards. It is said to have its place in the electrical and industrial plant, the office, motorboat, garage, truck, pleasure automobile and home.

Free literature is available from American-La France-Foamite Corporation upon request.

●

Synthetic Rubber Apron

A new heavy duty, oil-proof industrial apron, made with *Ameripol* synthetic rubber, has been added to its industrial clothing line, it has been announced by *The B. F. Goodrich Company*.

The new apron size is 34″ by 47″; it weighs 1½ pounds, and is hemmed throughout; fitted with four grommets.

The company has previously had a lightweight *Ameripol* industrial apron in its line.

●

Catalog on Abrasive Belt Polishing Equipment

A tremendous advance in the efficiency of abrasive belt polishing is claimed through the use of *Presto Contact Wheels* and *Presto Back-Stand Idlers* as described in the new *Bulletin 104* issued by *The Manderscheid Company*, 810 Fulton Street, Chicago 7, Ill.

Copy mailed promptly on request.

●

Brown Instrument Opens Branch Office in Tulsa

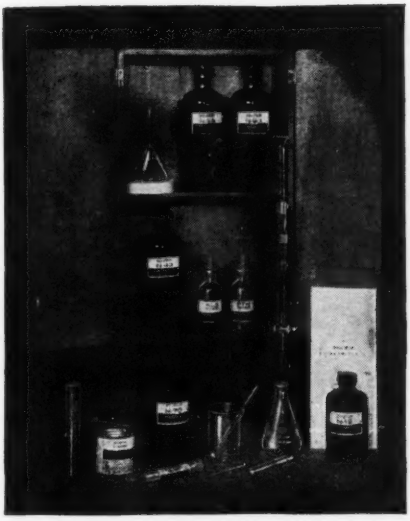
The *Brown Instrument Division* of *Minneapolis-Honeywell Regulator Company* has opened a new branch office at 117 West Eighth Street, Tulsa, Okla., in charge of *R. P. Walker*, Branch Manager.

The new location, within a few blocks of Tulsa downtown oil company offices, includes storage space for instrument accessories, supplies and emergency repair stock, permitting the Brown company to render extended maintenance and servicing.

●

Endemano in New Location

The *Endemano Plating Company* has announced the opening of new quarters at 2080 Belgrave Avenue, Huntington Park, Calif.



CHROMIUM
NICKEL
COPPER

Simple test sets for aid in controlling plating and other solutions.

Write for literature.

KOCOUR CO.

4801 S. ST. LOUIS AVE.
CHICAGO 32, ILL.

Specify Kocour Sets from your supplier.

New Wagner Brothers Plant

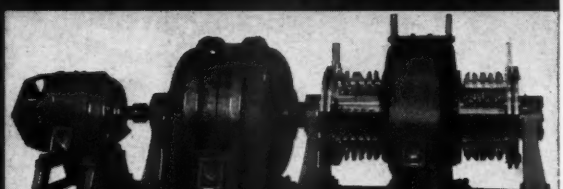
The new home of *Wagner Brothers*, suppliers of materials and equipment for metal finishing industries, is located at 400 Midland Avenue, Detroit 3, Mich.

This modern plant will house an analytical laboratory and a complete pilot plant for customers' tests, as well as an expanded stock of supplies and machinery.

Corrosion-Resistant Floor Paint Offered by Tiz-Nu

Rubbermastic Concrete Floor Paint, made from 100% gilsonite, claimed to dry tack-free in four hours to enamel-like finish, and producing colors in gilsonite is announced by the Los Angeles division of *Tiz-Nu Corporation*, 673 Coronado Street.

COLUMBIA MOTOR GENERATORS



FOR ELECTRO-PLATING

Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electroplating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.
4519 HAMILTON AVE., N.E. CLEVELAND 14, OHIO

Tiz-Nu claims its product will eliminate the necessity of etching or priming and do away with saponification troubles, and also is 100% waterproof. Flushing floor with water after paint is dry causes flint-like hardness and will resist any acid, alkali, heat, electrolysis, and the abrasive effects of dirt and sand.

•

Charles Boll Joins Udylite

Charles Wykoff Boll, Jr., has become a member of the staff of the New York office of *The Udylite Corporation* of Detroit. He will operate in Virginia, Maryland, Delaware and part of Pennsylvania.

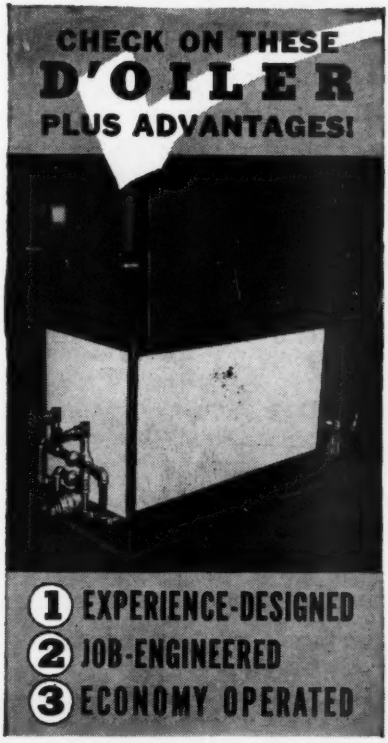
Until recently Boll was in the Marine Corps stationed in that organization's plating shops at Washington, D. C. There he served as Assistant Metallurgist and Plant Chemist.

Before entering the service he was Chemist with the Harrisburg Steel Corporation. He is well known in Pennsylvania engineering circles.

•

New Waterproof Adhesive Announced by duPont

A new synthetic, waterproof adhesive, claimed to be more resistant to oxidation than similar natural rubber compounds, has been announced by the *du Pont Fabrics Division*. The new cement is recommended



FOR THOROUGH METAL CLEANING

The D'OILER Vapor Spray machine, illustrated above, can be used as a vapor-spray, or a straight vapor degreasing unit. Drain table recaptures dragout from basketed parts . . . all-around insulation reduces heat losses . . . exhaust duct on two sides safeguards operator . . . pump drive for standby solvent eliminates hand pouring.

Every D'OILER type is built to do a specific job . . . is designed with the "on-the-job experience" necessary to provide a degreaser that does the work, in the required volume, economically.

Our engineers will gladly advise on degreasing problems; your inquiries will receive prompt attention. Write today.

Mechanical
PROCESS COMPANY
P. O. BOX 88, SOUTH ORANGE, N. J.

Finishing
Foremen:

We can prove BURNS STEEL SHINE meets every requirement in cutting and coloring Stainless or Carbon Steels – from sharp cuts without color to producing mirror finishes. Detail problems to us for samples of the right grades.

E. Reed Burns Mfg. Corp.
Brooklyn 11, N. Y.
Since 1888

The "Know How" People

ACID AND ALKALI PROOF
LININGS AND MORTARS

•

ACID PROOF
CONSTRUCTION

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THE CEILCOTE CO.
Consulting and Research Engineers
750 ROCKEFELLER BLDG.
CLEVELAND, OHIO

for bonding Buna-N type synthetic rubbers and vinyl films or sheet stocks to rigid surfaces such as steel, aluminum, glass, wood, or concrete.

Designated as *No. 5118 "Fairprene" Adhesive Cement*, the new adhesive is a thermoplastic synthetic elastic composition that does not require vulcanization to obtain maximum adhesive strength. Oils or straight gasoline will weaken the bond strength only slightly, although aromatic hydrocarbons will destroy the bond. Unaffected by temperatures as low as 40° F, the new cement's adhesive strength is weakened at temperature of 160° F, and above. Full bond strength is regained, however, after cooling to normal temperatures.

Cold-setting, the new adhesive will dry to a tacky surface, under average conditions, in three to 10 minutes, and dry completely within two hours.

The cement was developed in the du Pont Fabrics Division plant at Fairfield, Conn., home of *"Fairprene"* coated fabrics and adhesive compositions.

•

Spray-Pickling Machine Announced by Goodrich

A new spray-type machine for continuous pickling and washing of any metal part requiring surface preparation for the application of enamel or other coatings or for the removal of scale has been announced by *H. C. Kleim*, Manager, Rubberlined and Rubber covered Equipment, Industrial Products Sales Division of *The B. F. Goodrich Company*.

Pieces are fed onto a conveyor at the entrance to the machine and carried through the spraying and washing cycles, emerging acid free and ready for the succeeding operations.

Each unit is designed individually to suit the particular manufacturing problem and are lined with rubber by the company's famous Vulcalock process of adhering rubber to metal. The machine has been used successfully for pickling cartridge cases and preparing steel hollow-ware for enameling.

Production can be standardized, no special equipment being required for handling pieces of different shapes and sizes; no special racks are required for handling.

The spray principle removes scale and foreign material faster and more thoroughly.

Greater safety in operation is assured through confinement of all acid and acid fumes in the chamber, eliminating danger from splashing and dripping, as well as fumes, common hazards of dip pickling.

Operations are simple, since no complex conveyors are involved. Labor costs are thus reduced.

Acid use is more efficient, since it is circulated continuously, automatically providing complete agitation and efficient use for a longer time.

•

L. H. Moulton, D. T. Buist Named Turco Sales Chiefs

Appointment of *L. H. Moulton* to the

post of National Sales Director and *D. T. Buist*, Assistant National Sales Director, was announced recently by *Ray Sanders*, Vice-President and General Manager, *Turco Products, Inc.* Their headquarters will be the firm's main offices in Los Angeles.

These appointments mark another step in the growth of this concern which manufactures several hundred specialized cleaning and processing compounds for the metal finishing and 21 other industries here and abroad. During the past two decades Turco has established four factories in Los Angeles, Houston and Chicago. Selling direct to the industrial consumer, Turco main-

Hammond of Kalamazoo

"101" Operations Made Easy!

Model F-2 FLEXIBLE BELT Bench or Floor Type

Grinding, Polishing, Deburring, Chamfering on irregular or regular shaped parts. Soon pays for itself.

SHIPMENT FROM STOCK

Hammond Machinery Builders, Inc.

1613 Douglas Ave. • Kalamazoo 54, Mich.

Zialite

Reg. U. S. Pat. Off.

For NICKEL PLATING

The one bath especially designed for plating WHITE METAL ALLOYS including ZINC, LEAD and ALUMINUM.

FOR HARD CHROMIUM USE Zialite ADDITION AGENTS

Send a sample of your present bath to see if it is suitable for conversion to this improved formula.

ZIALITE CORPORATION
92 Grove Street
Worcester 5, Mass.

"YANKEE BRAND"

PROGRESSIVELY BETTER
ABRASIVE COMPOUNDS

Tailored to fit all
finishing requirements.

Inquiries respectfully solicited

★

E. E. SEELEY COMPANY
(est. 1919)
Manufacturers
BUFFING COMPOSITIONS
FOUNDRY FACINGS
900 Housatonic Ave., Bridgeport, Conn.
Tel. 5-0943

McKeon's
Zinc-Brite
TRADE MARK REG'D.

spells EFFICIENCY—
ECONOMY

Improves appearance of, and brightens your zinc deposit by removing heavy metal impurities from cyanide zinc plating solutions.

SULPHUR PRODUCTS CO.
Greensburg 9, Pa.

tains sixty-five warehouses and sales offices staffed with trained technical service men.

Fifteen years' experience in the selling of Turco's broad chemical line gives Lou Moulton excellent qualifications to direct the nationwide sales-service staff. A graduate of Colorado College of Agriculture, Mr. Moulton was well known in the dairy and allied industries for many years, joining Turco in 1931. For the past eight years he has directed Turco's Eastern Division from the Chicago plant office.

Dan Buist, Assistant National Sales Director, joined Turco in 1936 as a specialist with 20 years' experience in the automotive field. Transferred to the Aviation Division in 1939, he was promoted to District Sales Manager in 1943 and Western Zone Sales Manager in 1944.

●

New Fire-Fighting Weapon Puts Out Blaze in Seconds

Newest development in fire-fighting efficiency is the Underwriters-approved, stored-pressure hand extinguisher manufactured by *Union STOP-FIRE Corporation*, Brooklyn, N. Y.

While ease of operation and accuracy of aim are significant improvements, the character of the fluid in the *STOP-FIRE* extinguisher is similarly an important advancement.

Up to now, carbon tetrachloride has served as the fire-fighting agent in most extinguishers. In *STOP-FIRE*, however, carbon dioxide is combined with carbon tetrachloride to produce a chemical of extraordinary effectiveness in putting out fires.

Shot as a fine spray from the *STOP-FIRE*, this doubly effective chemical is converted instantaneously into a heavy, fire-smothering gas. Even fires of the most stubborn kind—oil, ether, gasoline, electrical—are blanketed and snuffed out in a matter of seconds.

The *STOP-FIRE* extinguisher has a long range, the bulk of the stream traveling anywhere from 15 to 25 feet.

The fluid is effective indefinitely, and the *STOP-FIRE* tank does not have to be refilled, except when used. A pressure gage attached to the extinguisher indicates fluid pressure at all times.

STOP-FIRE stored-pressure extinguishers are manufactured of 85–15 brass, are noncorrosive, and there is no possibility of zinc oxidation. Absence of moving parts make the *STOP-FIRE* instantly usable whenever needed, since there is nothing to get out of order at any time, it is claimed.

●

New Korolac Solution Developed by Goodrich

A new *Korolac* solution for the coating of electroplating and pickling racks has been developed by *The B. F. Goodrich Company*, Akron, Ohio, which embodies the well-known chemical inertness of *Koroseal Tank Lining*. The new product is known as *Korolac RX-2500*.

A second new development, known as *Korolac Primer No. A-208-B*, is used in conjunction with *Korolac RX-2500*, to provide adhesion of the Korolac coating to the metal rack. This primer is brushed onto the rack and areas adjacent to the contact points, thereby preventing contamination of plating baths by carry-over of solutions underneath the protective rack coating.

The new coating is white, opaque, and glossy. Hot alkali reverse current cleaners and such oxidizing acids as chromic and 40% nitric have little or no effect. The resistance to organic solvent cleaners is also remarkably good.

When PERMAG goes into Action!

—the electroplater knows that he will get a perfectly clean surface for the final finish.

PERMAG Cleaning Compounds will be more than ever on the job for the electroplating industry in 1947. Depend on PERMAG economy and efficiency in metal cleaning.

MAGNUSON PRODUCTS CORP.

50 Court St., Brooklyn 2, N. Y.

In Canada
Canadian PERMAG Products Ltd.
Montreal

Custom-Built
TANKS
For Cleaning, Pickling and Plating

● For 39 years leading manufacturers have relied on Kirk & Blum for custom-built tanks to meet their individual production requirements.

We are equipped to fabricate tanks of Steel, Lead or Rubber Lined, Monel Metal, Stainless Steel, Copper, Aluminum, Inconel, etc.

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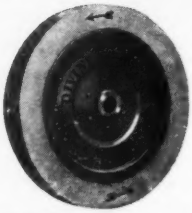

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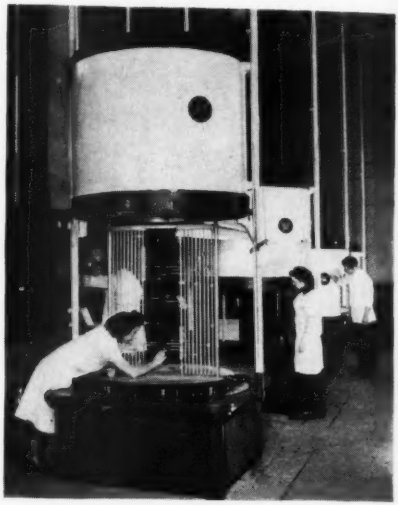
First Volume Production of Transparent Mirrors Underway

The world's first volume production of transparent mirrors has been announced by *Libbey-Owens-Ford Glass Company*, Toledo, Ohio, which foresees an extensive use of the product in homes, commercial enterprises and public institutions. The transparent mirror functions as a reflective surface when seen from one side and simultaneously as a window when viewed from the other.



The development constitutes the first peacetime application of what was once highly secret wartime advance in the techniques of mirror manufacture, according to *G. P. MacNichol*, L-O-F Vice-President. The process was first successfully removed from the laboratory stage by technicians of the company's *Liberty Mirror Division* at Brackenridge, Pa., shortly after Pearl Harbor.

Transparent mirrors can be installed in doors of houses and apartments, permitting housewives to examine callers without revealing their own presence, Mr. MacNichol pointed out. Among other possible applications he included panels for doors between kitchens and dining rooms, to permit those serving from the kitchen to watch the progress of a meal, themselves unobserved, glazing of shower stalls and fireplace screens. The mirrors will also be used, he pre-

dicted, for observation windows in child behavior clinics and psychiatric wards of hospitals; for "security" windows in banks, brokerage offices, post offices and department stores; in television production and advertising displays.

Key to the transparent mirror's performance is the almost incredible thinness of the film of chromium alloy with which it is mirrored. While constituting an effective reflecting surface it also permits passage of light. The film is four ten-millionths of one inch thick.

•

The Job Shop Industry

According to the November issue of the *Monthly Bulletin* of the *Masters' Electroplating Association*, 125 William Street, New York City, the rate of operations among the members of the Association for November was 82% compared with 83% for October and 63½% for November, 1945.

While the industry is still operating at a good rate, certain unfavorable signs have appeared during the last month.

In the first place we have received numerous reports that orders are declining. This decline is not yet reflected in the Rate of Operations as many shops are still working on their backlog of unfilled orders. Also employers are reluctant to lay off experienced help, even when work is slack. Such help is hard to replace when it is again needed. Under these conditions a shop is likely to operate at a loss, hoping for business to revive.

It must be noted, also, that wages have again risen by a recent cost-of-living increase of 10% given to the employees of the shops under contract with Local 8.

Customers are short of steel and are consequently reducing their orders. Platers' supplies such as chemicals, anodes, buffs, compositions, etc. are also short and steadily rising in price. Copper, cadmium and nickel anodes have been increased. It may be that price increases will cause supplies to become more easily available; it is hoped so. But in the meantime platers are suffering from short supplies and high prices at the same time.

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Leaflets on Hose Issued By B. F. Goodrich Company

New catalog leaflets on its sand blast hose, brewers, wine and vinegar hose, and creamery and sanitary hose have been published by the *B. F. Goodrich Company*, Akron, Ohio, and are now available upon request. The leaflets describe construction of the products, and gives data on sizes, weight per hundred feet, outside diameters and working pressures.

•

New Chain Hoist Bulletin

Chester Hoist Co., Lisbon, Ohio, has just issued a new 16-page Bulletin in two colors, covering its complete line of *Spur Geared* (High Speed) and *Differential Chain Hoists*, together with its *Army Type Low Headroom Timken Equipped Trolley Hoists.*

It is also filled with tables, section and photographic views of the various products, including a complete line of *I-Beam Trolleys.*

A copy will be sent to anyone writing on the company's stationery to the above address.

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1—Steel tank for copper strike 30" x 15" x 15" deep x 3/16 plate. Not lined

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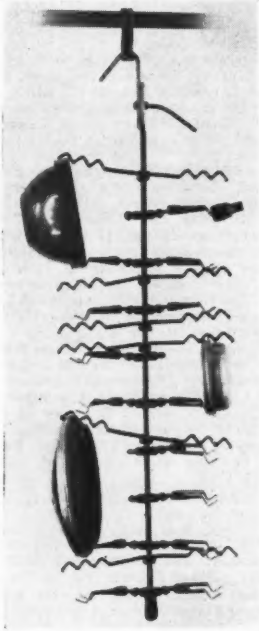

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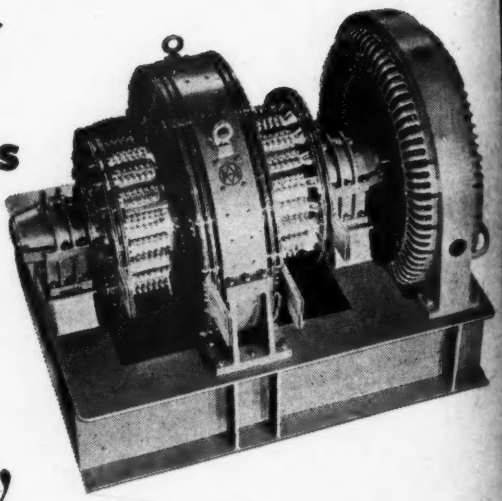

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